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FOOD DISTRIBUTION FACILITIES
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Marketing Research Report No. 835

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PREFACE AND ACKNOWLEDGMENTS

This study describes the present food distribution facilities of Dayton and presents plans for modern and efficient facilities.

The highlights of the study were given at a public meeting at Dayton in October 1966, and civic groups have used the data for initial planning.

The kindly cooperation of the food distribution firms, city officials, the South of Third Association, the Dayton Area Chamber of Commerce, the Dayton Food Trade Association, and the railroads serving Dayton is deeply appreciated.

William A. Fitzpatrick, President of the South of Third Association and Chairman of the Mayor's committee for relocation of the produce merchants on St. Clair Street provided leadership for the study. Andrew Drysdale, an assistant to Mr. Fitzpatrick, was helpful in coordinating public interests. Ira H. Schlezinger of the City Plan Board, on the staff of Planning Director Robert A. Flynn, worked concurrently on the project. Robert W. Scott, Manager of the Economic Development Department of the Dayton Area Chamber of Commerce, collaborated on the conduct of the study.

The report was prepared under the general supervision of William C. Crow, Director of the Transportation and Facilities Research Division, Agricultural Research Service. The building designs, site layout, and construction cost estimates were developed by Allison B. Lowstuter, architect. Significant contribution on refrigeration was made by Steven J. Toth, mechanical engineer.

Generous assistance and consultation were provided by the staff and employees of the Marketing Facilities Development Branch and by other members of the Transportation and Facilities Research Division.

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FOOD DISTRIBUTION FACILITIES IN DAYTON, OHIO

By *Paul J. Hanlon, industrial engineer, Transportation and Facilities Research Division, Agricultural Research Service*

SUMMARY

Development of a new food distribution center to replace inefficient, outmoded, and poorly located facilities in Dayton, Ohio, could save an estimated $826,000 annually in marketing costs. This estimate is based on costs of cartage, handling, interdealer transfers, spoilage, deterioration, breakage, shrinkage, and rent for 34 independent food firms who are expected to relocate in multiple-occupancy buildings. New facilities are recommended for 35 of the 65 independent firms in Dayton. No cost estimates were made for one firm for whom a single-occupancy building is recommended.

The food center would include facilities for fruits and vegetables, meat and related products, dairy products and eggs, groceries, and frozen foods.

At the time this study was made, 65 independent food firms and 11 food chains received and distributed about 616,000 tons of foods through the marketing channels of the city. Of this amount, 493,000 tons, or 80 percent, was distributed in Greater Dayton and 123,000 tons was transported to areas outside the city.

In 1964, these 65 independent dealers who distributed 253,062 tons needed new facilities to some degree, but 35 of them who distributed 170,969 tons needed new facilities badly. Some of these dealers are in areas considered for urban renewal.

To accommodate those 35 needing new facilities badly, the following buildings are suggested: Four multiple-occupancy buildings containing 55 store units, excluding the unit used for a restaurant, with 196,525 square feet of floor space for 34 dealers; and one single-occupancy building, with about 96,000 square feet, for one large-volume grocery firm. A farmers' market with 20 covered stalls is also recommended.

These facilities, with space for future expansion and for operators in allied industries who may wish to locate in the center, would require about 75 acres of land. Four city sites were evaluated: Needmore, Woodman-Patterson, Marshall-Hempstead, and West River. Advantages and disadvantages of each are outlined.

Investment costs of land and facilities, using the Needmore site, were estimated as follows: $3,569,000 for the four multiple-occupancy buildings, $66,000 for the farmers' market, $1,209,000 for the single-occupancy grocery building, and $53,000 for 42 acres of land reserved for allied industry. Total investment costs for the food center amounted to $4,897,000.

In addition to a reduction in marketing costs, the food center would accrue other benefits to food firms, buyers, railroads, truckers, farmers, consumers, and the city. Some of these benefits would be improved price-making and price-reflecting forces, simplified rail and truck operations, easier maintenance on quality of food, reduction in sanitation problems, higher tax base and revenues through better economic use of present market areas, and higher values of land used for the new development.

BACKGROUND OF THE STUDY

This study of food marketing facilities in Dayton was made at the request of the South of Third Association, after the association had established the Midtown Mart urban renewal project. This project would displace fruit and vegetable firms and the farmers' market in the Midcity market area on South St. Clair Street. The Midcity market is in a blighted area that city officials plan to develop into a retail shopping plaza.

An exploratory study of food facilities made in 1964 established the need for a full study of all food operations in the city.

City officials realized for many years that the old market area on South St. Clair Street was deteriorating and failing to meet service requirements. Many officials of civic and business organizations believe the serious deficiencies in the handling and marketing of food in the city should be corrected and modernized without further delay. They were given additional incentive toward improving food facilities by the nearly completed intersecting expressways—the north-south Interstate Route 75 and east-west routes, Interstate 70 and U.S. 35—that would make the city easily accessible to all sections of the country.

Data in this report were obtained with the assistance of the South of Third Association, The City Plan Board, and the Dayton Area Chamber of Commerce, and by personal interviews, observations, and examination of records of various food handling firms. Each food dealer in the city was interviewed to obtain information on the volume and kinds of products handled, plant space used, costs, and certain other data relating to existing operations. Information was also obtained from buyers and from truckers hauling to and from the food firms. Other data and statistics were supplied by officials of the city, State and Federal Governments, the railroads, and labor organizations. The data relating to volume of commodities handled and costs in present marketing facilities were based on calendar year 1964, the latest year for which data were available at the time of the study.

The cost data were obtained by examining records of food firms and analyzing time-study information. These estimates were then checked with similar cost studies made for other cities. In computing costs, dealers were sampled in such a way that all volumes and types of operations would be represented.

The study had the following objectives:

- To determine the adequacy of the marketing facilities in Dayton for present and future needs.
- To develop plans and designs for new facilities and consider sites that would be adequate to provide the most efficient means of distributing Dayton's food supplies.
- To estimate costs of facility construction, possible operating expenses, and source of income in the proposed facilities.
- To estimate probable savings and other benefits from any suggested improvements.

FOOD MARKETING IN DAYTON

Dayton is an industrial city in southwest Ohio. In the 1960 Census of Population, the Dayton Standard Metropolitan Statistical Area (SMSA) included Miami, Montgomery, and Greene Counties, and had a population of 694,623.[1] This area is joined on the northeast by the Springfield Metropolitan Statistical Area and on the southwest by Hamilton-Middletown Metropolitan Statistical Area. The total population of the three areas in 1960 was slightly over a million people. Dayton wholesalers distribute throughout these areas.

In this study, Montgomery County, with about 527,000 consumers, is the immediate area serviced by Dayton food firms. Montgomery County will be used interchangeably with Dayton in this report.

A map of the Dayton area is shown in figure 1.

Number of Dealers, Volume of Receipts, and Marketing Costs

The Midcity market, the only concentrated food market in the Dayton area that was solely a fruit and vegetable market, housed eight independent food firms. The farmers' market was also located in this area. All other independent food firms were dispersed throughout the city and their market area is referred to in this report as "other Dayton." A total of 65 independent food firms was in Dayton.

There was only one regional food chain in Dayton. Ten other regional or national food chains or associated groups with warehouses outside of Dayton distributed within the city. Their local storage facilities were usually adjacent to their retail stores. Public warehouse space in the city was occasionally used by this group for temporary storage.

All operators were classified as handling one of the following commodity groups: (1) Fresh fruits and vegetables, (2) meat and related products, including poultry and fish, (3) dairy products and eggs, (4) groceries, and (5) frozen foods.

The number of food firms and the total volume of the five food commodities received in Dayton in 1964 are shown in table 1. The total volume of direct receipts was 615,984 tons, of which 502,990 tons, or 82 percent, arrived by truck. The remaining 112,994 tons, or 18 percent, arrived by rail. Because accurate data on piggyback receipts are not available, volumes received by this method were included in truck receipts. Products originating from local producing areas as well as local processors were likewise truck receipts, but were listed separately in table 1.

The 11 food chains handled 362,922 tons or 59 percent of all food products received in the Dayton area in 1964. The independent food operators handled 253,062 tons or 41 percent of the total volume received.

Only 46,200 tons of fruits and vegetables, or 8 percent of all food products marketed in Dayton, were handled by independent food firms in the Midcity market area.

Slightly over half (51 percent) of all food commodities handled in Dayton was groceries; 20 percent, fruits and vegetables; 13 percent, meat and related products; 9 percent, frozen foods; and 7 percent, dairy products and eggs.

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[1] U.S. Bureau of the Census. *U.S. Census of Population: 1960. General Social and Economic Characteristics, Ohio.* Final report PC(1)-37C. U.S. Govt. Print. Off., Washington, D.C. 1962.

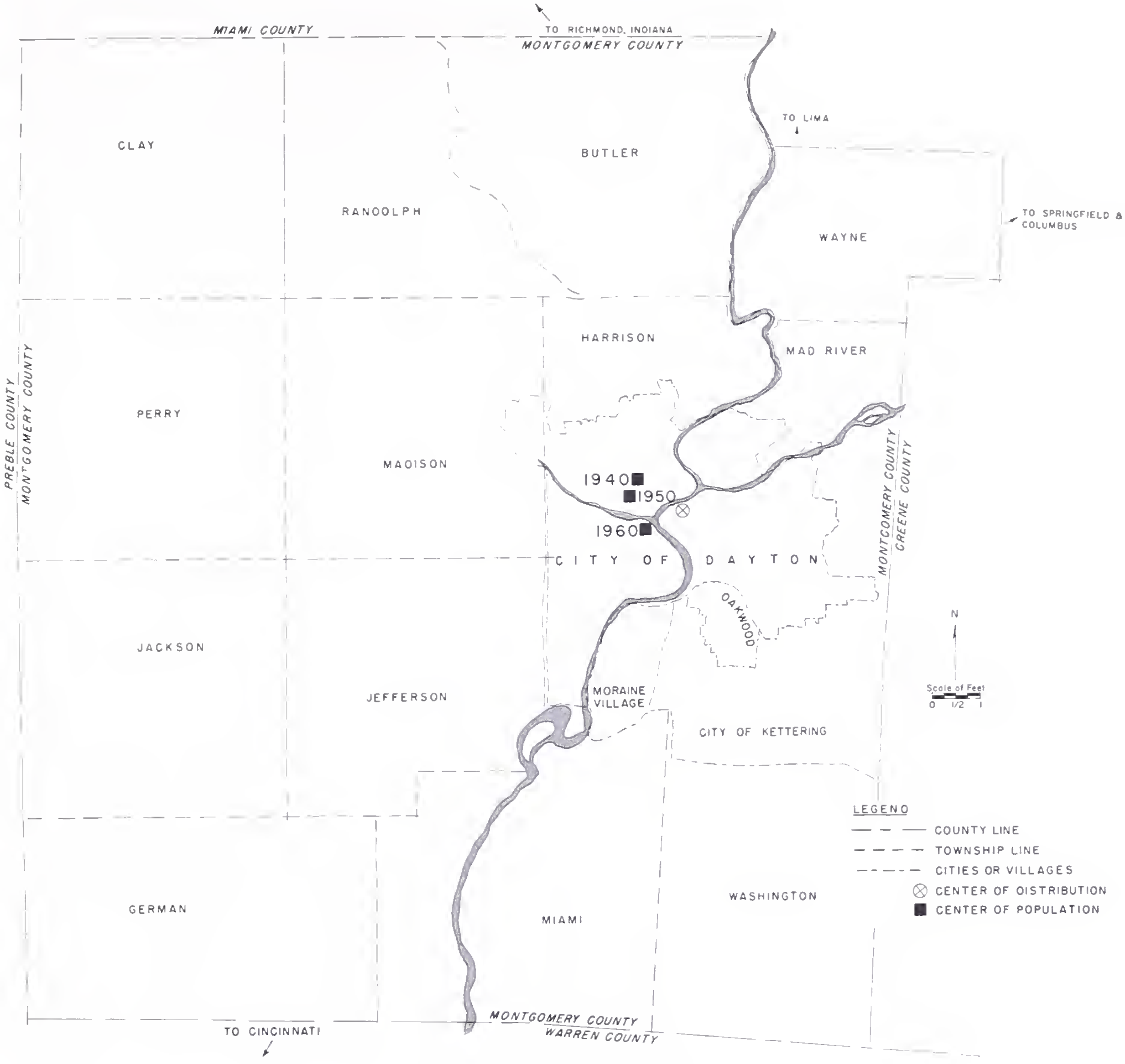

Figure 1.–Map of the Dayton area.

In 1964, food firms in Dayton received 120,744 tons of fruits and vegetables. Independent operators handled 55,494 tons, or 46 percent of all fruits and vegetables, and food chains the major part, 65,250 tons or 54 percent. A total of 46,200 tons, or 38.3 percent of the total, was handled by the Midcity market area wholesalers. More than 85 percent of the fruits and vegetables were received by truck and slightly less than 15 percent arrived by rail.

Food operators received 82,594 tons of meat, poultry, and seafood. The food chains received 45,562 tons and the independent dealers, 37,032 tons. About 81 percent of the products arrived by truck and the remaining 19 percent by rail.

A total of 43,861 tons of dairy products and eggs was handled by all food operators. Slightly over half, or 22,000 tons, was received by food chains and the remaining 21,861 tons were received by the independent operators. Of the total volume received, 94 percent arrived at dealer facilities by truck, and the rest by rail.

Food operators received 52,125 tons of frozen foods. Independent operators handled 35,195 tons and food chains 16,930 tons. Receipts by method of transportation showed that 23,365 tons were received by rail and 28,760 tons by truck. More than twice as much frozen food was received by independent dealers as by food chains. Some of the frozen foods received by independent operators were distributed to chain stores.

TABLE 1.–Number of food firms and estimated volume of direct receipts, by method of transportation, Dayton, 1964

Commodity, type of wholesaler, and market area[1]	Wholesalers	Direct receipts			
		Rail	Truck		Total
			Total[2]	Local origin	
	Number	*Tons*	*Tons*	*Tons*	*Tons*
FRUITS AND VEGETABLES					
Independent dealers:					
Midcity market	8	7,500	38,700	(3,225)	46,200
Other Dayton	11	700	8,594	(123)	9,294
Total	19	8,200	47,294	(3,348)	55,494
Food chains	(3)	9,281	55,969	0	65,250
Total	19	17,481	103,263	(3,348)	120,744
MEAT & RELATED PRODUCTS					
Independent dealers	12	6,894	30,138	(3,905)	37,032
Food chains	(3)	9,101	36,461	0	45,562
Total	12	15,995	66,599	(3,905)	82,594
DAIRY PRODUCTS AND EGGS					
Independent dealers	14	1,140	20,721	(6,446)	21,861
Food chains	(3)	0	22,000	0	22,000
Total	14	1,140	42,721	(6,446)	43,861
GROCERIES					
Independent dealers	9	33,170	70,310	(775)	103,480
Food chains	(3)	21,843	191,337	(4,264)	213,180
Total	9	55,013	261,647	(5,039)	316,660
FROZEN FOODS					
Independent dealers	11	19,360	15,835	(444)	35,195
Food chains	(3)	4,005	12,925	0	16,930
Total	11	23,365	28,760	(444)	52,125
ALL FOODS					
Independent dealers:					
Midcity market	8	7,500	38,700	(3,225)	46,200
Other Dayton	57	61,264	145,598	(11, 693)	206,862
Total	65	68,764	184,298	(14, 918)	253,062
Food chains	11	44,230	318,692	(4,264)	362,922
Total	76	112,994	502,990	(19, 182)	615,984

[1] All of the independent dealers except 8 fruit and vegetable dealers in the Midcity market were in other Dayton areas.
[2] Includes local origin.
[3] Each food chain handled some of all food commodities listed.

Midcity Market

The Midcity market area covered about 9 acres, including a half-acre farmers' market. General boundaries for the area are North, Third Street; east, Patterson Boulevard; south, Fifth Street; and west, St. Clair Street. It was in the middle of the dense business district just two blocks east of Main Street.

There were eight facilities occupied by eight fruit and vegetable firms. None of the facilities had platforms or railroad house tracks. Because St. Clair Street was part of U.S. Route 25, dealer and shipper trucks had to back into the stores or alleys. The shorter buyer trucks were allowed to back to the curb. Employees parked their cars elsewhere. Movement of produce to buyers' trucks or between dealers was made by four-wheel handtrucks on the rough sidewalk, which was obstructed by unloads and displayed items.

Operations will probably be even more cramped when the construction of U.S. Route 35 is completed. This highway will cross the south end of the market. Under new zoning ordinances applicable to the area, food distribution firms will not be permitted.

Receivers of large quantities in the Midcity market supplied some jobbers and purveyors in other Dayton areas. They also catered to large independent supermarkets. They supplied only 2 percent of the receipts of food chains, whereas 15 percent was a common occurrence for independent food suppliers in several other cities. Food chains received produce from out of town to cover fill-ins and shortages.

Associated industries in the Midcity market area were four restaurants and three parking lots. Other facilities in the area were 13 nonmarket stores, one vacant store, and two vacant warehouses. Figure 2 shows the occupancy of the facilities in the Midcity market area.

The farmers' market lies between Fourth and Fifth Streets and between St. Clair Street and Patterson Boulevard, just south of the facilities used by fruit and vegetable operations. When the farmers' market is not operating, this triangular area is a city parking lot.

In 1964, land in the market area was assessed at \$1.84 per square foot and buildings at \$1.11, totaling \$2.95 per square foot for land and building. Figure 3 shows a part of the market area.

Other Dayton Food Facilities

Food facilities in the other Dayton areas were scattered over the city. Most of these facilities were producer, processor, or local services. No attempt had been made to group them into a common area or an industrial park with the stress on marketing, sales, or distribution.

Their operations were beset by the same congestion and traffic conditions that hurt the Midcity market area. The streets were narrow and crowded. The traffic arteries were not direct from source or to destination, and there was much interference by nonmarket vehicles.

Few food firms were close together to share carlots or trailer loads, or to permit buyers to save time in shopping as they could in a unified market. There was little other cooperation possible, such as economical arrangements between carlot receivers and jobbers. Communications concerning quantity, quality, arrivals, and costs of supplies were poor among the dispersed wholesalers.

Each food operator was asked if he considered his facility adequate. Almost everyone said that his facilities were definitely adequate. The facilities were even more inadequate than the proprietors realized. A few firms had attempted to improve their facilities, but each had found that even after spending a considerable amount of money in improvements, the facilities were still inefficient.

Buildings were inefficient for normal operations because these buildings were not designed for such uses. Most of them had no platforms on which to unload incoming supplies or to assemble and load outgoing products. Many of the stores had only front entrances through which all products must move into and out of, and, consequently, much of the space in the rear of these stores was inefficiently used. Few had house tracks.

The interiors of the facilities were generally even worse than the exteriors. Space was poorly arranged; some of the floors were broken, and coolers were small and crowded. Passageways were crowded and often littered with debris and trash.

Many facilities had a shortage of space for receiving, stacking, storing, administering, accounting, selling, ripening, cooling, freezing, and shipping. One difficulty was not so much a matter of lack of space as a lack of using the cubic volume of space advantageously.

Public Warehouses

The Dayton area had three public warehouses. They were multistory buildings of brick and concrete. These warehouses were congested; they had small doorways and low ceilings, insufficient house tracks, and little parking space as they were crowded between other buildings. The warehouses had insufficient platform space and slow-moving elevators that caused excessive handling time. The railroad tracks were across the street from one building, requiring truck loading and unloading to move carlots about 100 feet.

The total space available for the storage of food and other farm products was 1.4 million cubic feet, about 90 percent of which was refrigerated.

Facility Ownership and Space Used

About half the independent food firms, 33 in 65, reported that they owned the facilities they occupied. Several others indicated they preferred to own their own facilities. Some said the facilities they were using were not worth the purchase prices placed upon them. Those owning their facilities handled 65 percent of the commodities handled by independent food firms. Table 2 shows the tenure status and direct receipts of the 65 independent firms.

The food firms occupied almost 19 acres of floor space—810,188 square feet (table 3). The average space per firm ranged from 3,864 square feet for dairy product and egg dealers to 32,920 square feet for grocery dealers. About 63 percent of the floor space used was on the first floor.

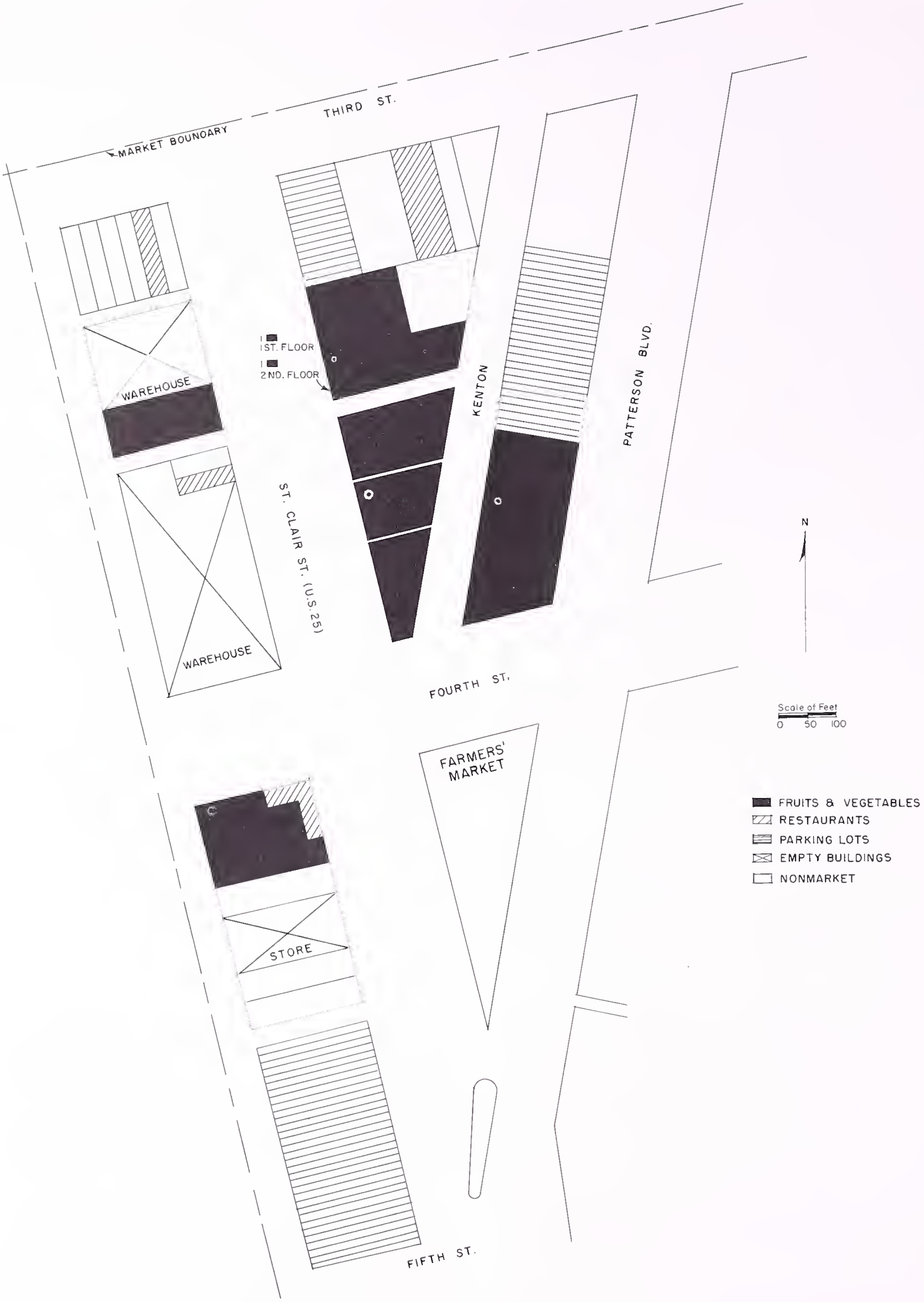

Figure 2.–Occupancy of facilities in the Midcity market area.

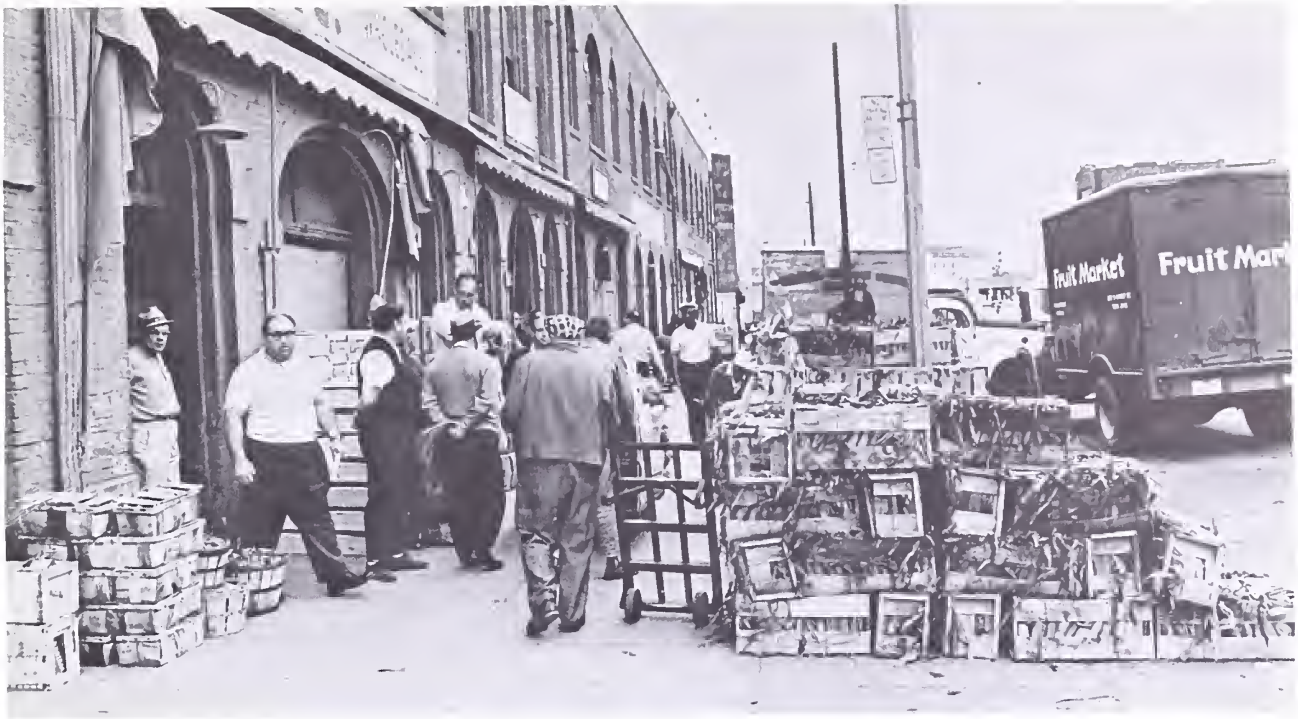

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Figure 3.—The Midcity market and a main artery for busy city traffic.

TABLE 2.—Tenure status and volume of direct receipts of independent food firms, by commodity group, Dayton, 1964

Commodity group	Owners		Renters		Total	
	Wholesalers	Volume	Wholesalers	Volume	Wholesalers	Volume
	Number	*1,000 tons*	*Number*	*1,000 tons*	*Number*	*1,000 tons*
Fresh fruits and vegetables	9	24.8	10	30.7	19	55,5
Meat and related products	7	33.6	5	3.4	12	37.0
Dairy products and eggs	8	5.0	6	16.9	14	21.9
Groceries	6	99.8	3	3.7	9	103.5
Frozen foods.	3	2.0	8	33.2	11	35.2
Total	33	165.2	32	87.9	65	253.1

Space was poorly used in the facilities. Out of the total of 810,188 square feet, an estimated 622,264 square feet, or 76.8 percent, was well utilized. Improper arrangement, poor location, and lack of proper handling equipment accounted for the rest being poorly used. Space for the cooler, freezer, and office was seldom used to good advantage. Space was used as follows: 53 percent for operations, 12 percent for coolers, 7 percent for freezers, and 5 percent for offices; 23 percent was not used. Operating space shown for frozen foods is comparatively low since freezer-storage space is also operating space.

Flow of Commodities Through the Market

Sources of Supply

Independent food firms in the Dayton area received over 25 percent of the volume of five groups of food commodities from Chicago and Cincinnati. About 20 percent came from the Midwestern States, excluding Ohio; the Far Western States accounted for about 12 percent. Almost 40 percent came from points within Ohio. Food commodities were received from virtually every State in the Union and from about a half dozen foreign countries. Table 4 gives a breakdown by

TABLE 3.–Space occupied and space used by 65 independent food firms, by commodity group, Dayton, 1964

Commodity group	Space occupied				Space used				
	First floor	Other floors	Total space	Average per wholesaler	Office	Cooler	Freezer	Operations	Total[1]
	Square feet	*Square feet*	*Square feet*	*Square feet*	*Square feet*	*Square feet*	*Square feet*	*Square feet*	*Square feet*
Fresh fruits and vegetables	126,209	23,200	149,409	7,864	7,210	8,186	0	92,799	108,195
Meat and related products	106,903	127,845	234,748	19,563	14,814	63,212	7,798	99,826	185,650
Dairy products and eggs	37,934	16,160	54,094	3,864	3,674	13,192	1,905	20,981	39,752
Groceries	200,781	95,500	296,281	32,920	7,350	9,296	6,515	206,900	230,061
Frozen foods	39,106	36,550	75,656	6,878	4,654	3,716	37,264	12,972	58,606
Total or average	510,933	299,255	810,188	[2]12,464	37,702	97,602	53,482	433,478	622,264

[1] Less than total space occupied because many facilities were two-story buildings, and the operators could not use second floors effectively.

[2] Average first floor space for all independent food firms was 7,861 square feet, and other space was 4,603 square feet.

TABLE 4.–Distribution of commodity groups of independent food firms, by point of origin, Dayton, 1964

Point of origin	Fruits and vegetables	Meat and related products	Dairy products and eggs	Groceries	Frozen foods	Proportion of total
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Dayton area	8.5	55.8	31.0	4.3	2.1	14.7
Cincinnati	38.6	1.4	.1	11.2	4.2	13.8
Columbus	0	.7	4.0	.1	.5	.5
Other Ohio	2.6	11.1	35.0	7.7	10.2	9.7
Chicago	1.4	13.4	1.7	21.0	3.6	11.6
Other Midwestern sources	10.7	10.8	26.3	29.9	9.3	20.1
Far West	5.1	0	.2	16.3	30.2	11.9
Texas and Southwest	5.7	1.7	0	1.6	5.4	2.8
Florida and South	8.6	1.7	.1	4.3	13.2	5.8
New York and East	6.8	.1	.3	2.2	18.5	5.0
All other sources	12.0	3.3	.8	1.4	2.8	4.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

commodity group and by place of shipment. Data on origin are based on the billing point known to the food operators and not necessarily the actual point of origin. Billing points were determined from the receipts of the independent food firms. The billing points of products received by food chains were not determined because most of these firms maintained regional warehouses outside the Dayton area.

A total of 38.6 percent of the receipts of fruits and vegetables came from Cincinnati. Although a high number of purchases were made from operators and shippers or brokers in Cincinnati, it was not a major production area. Cincinnati was, however, the single most important source of produce for Dayton food firms.

Locally produced meats and related products accounted for over half, or almost 56 percent, of the meats received by food operators. Substantial amounts were also received from producers in Ohio and other areas of the Midwest and from food firms in Chicago.

The sources of dairy products and eggs were similar to meat except the tonnage of these products coming from Chicago were small.

Groceries were received chiefly from Cincinnati, Chicago, other Midwestern sources, and Far Western States.

Frozen food receipts originated primarily in the Far West, Florida, and other East Coast States.

Interdealer Transfers

The movement of food commodities through the food marketing channels within the city is complex. Products must be received, unloaded, stored, some processed and packaged, sorted, loaded, and shipped to complete the distribution. These processes are further complicated by transfers between operators. Of the 615,984 tons of direct receipts, 43,072 tons were transferred between operators, making a total volume handled by all operators of 659,056 tons. These transfers were 7 percent of the total direct receipts. Detailed tabulations are shown in table 5.

TABLE 5.–Direct receipts, transfers between food operators, and total volume handled, by commodity group, Dayton, 1964

Commodity group	Direct receipts	Transfers	Total handled
	Tons	*Tons*	*Tons*
Fruits and vegetables .	120,744	16,830	137,574
Meats and related products	82,594	10,576	93,170
Dairy products and eggs	43,861	5,828	49,689
Groceries	316,660	3,544	320,204
Frozen foods.	52,125	6,294	58,419
Total, all foods. . .	615,984	43,072	659,056

Distribution of Commodities

Independent food operators in the Dayton area distribute almost as much food to outlets outside of the Montgomery County area as they do to outlets within the county. In 1964 a total of 130,014 tons of product, or 51.4 percent of the volume received by independent food firms, was distributed within the area, and 48.6 percent, or 122,988 tons, were distributed outside Montgomery County. Greater total amounts were distributed toward the south and lesser amounts toward the west. South from Dayton toward Cincinnati is an urbanized area. Table 6 shows the distribution by area and by commodity.

From 55 to 70 percent of the fruits and vegetables, dairy products and eggs, and frozen foods were distributed within Dayton. About 40 percent of the groceries and meat and related products were distributed in Dayton.

Independent food firms delivered 92 percent of their direct receipts to customers, which included restaurants, hotels, stores, and institutions. The remaining 8 percent was picked up by the customer. Fruit and vegetable dealers delivered 74 percent of their volume; meat operators, 99 percent; dairy product and egg firms, 97 percent; grocery firms, 95 percent; and frozen foods firms, 100 percent.

The flow of products through all food marketing facilities is shown in figure 4.

TABLE 6.–Distribution of food by independent food firms, by area and commodity group, Dayton, 1964

Destination	Fruits and vegetables	Meat and related products	Dairy products and eggs	Groceries	Frozen foods	Proportion of total
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Dayton area	70.6	39.7	62.3	41.9	54.6	51.4
Outside Dayton Area:						
North	7.1	16.2	8.0	15.4	11.5	12.5
East	7.3	16.2	10.1	10.8	11.8	11.0
South	7.5	22.5	11.1	23.7	11.1	17.1
West	7.5	5.4	8.5	8.2	11.0	8.0
Total outside	29.4	60.3	37.7	58.1	45.4	48.6
Total	100	100	100	100	100	100

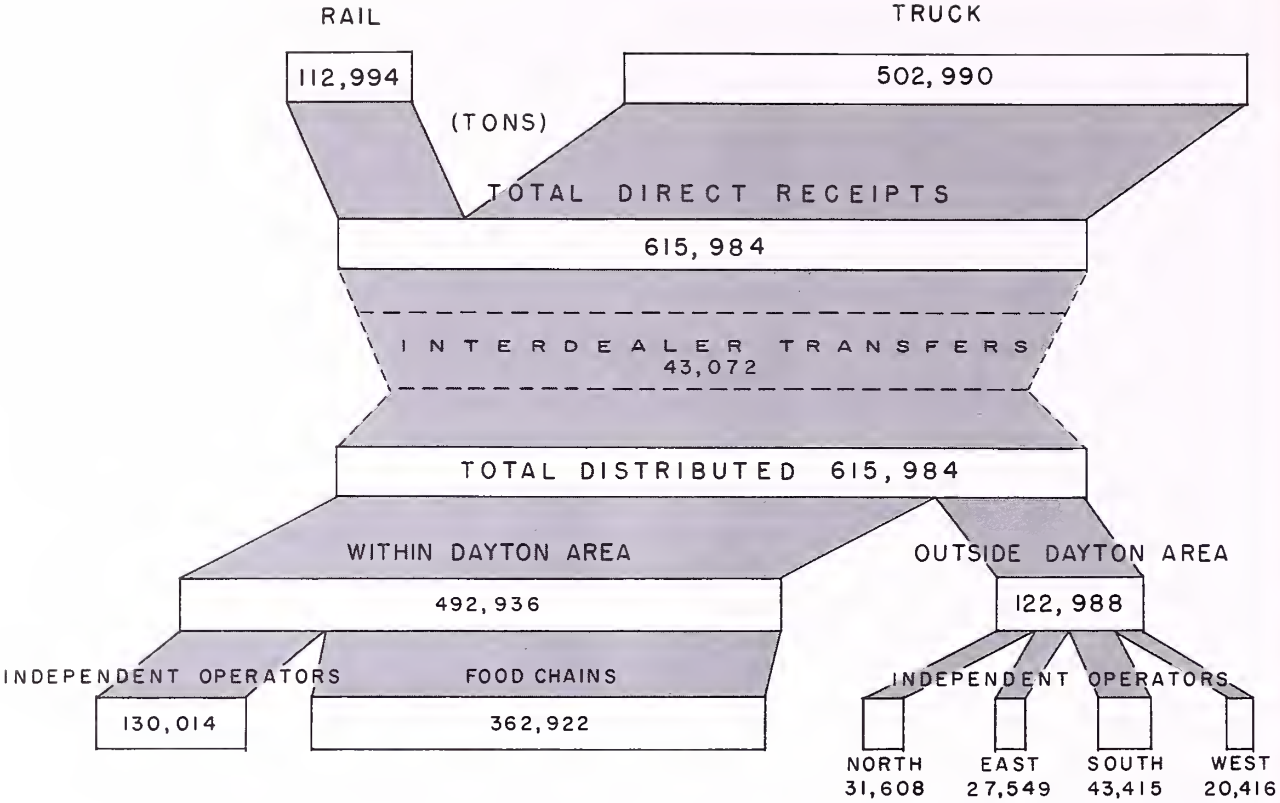


Figure 4.—Flow of all food commodities through the marketing facilities, Dayton, Ohio.

Some Marketing Costs Incurred by Independent Food Firms

An important part of the cost of marketing is the cost of excessive moving of merchandise within facilities. Costs depend largely on the kind of operation and the type of facilities used. Unnecessary handling of a commodity increases the chance of damage by handling and to some extent, the resultant costs, such as those of spoilage and product deterioration. Many of the costs of handling food products are intangible and cannot be measured readily. Measurable costs that would be affected by facility improvement and associated operations are (1) cartage from railroad track or point of initial receipt to firm's store, (2) handling of the commodities from point of arrival at the store through loading out for delivery, (3) transfers—the handling of products through more than one food facility, (4) spoilage, deterioration, breakage, and shrinkage, and (5) rental charges. These costs are estimated in table 7.

Cartage

Cartage costs are those incurred in loading commodities onto trucks and moving them from team tracks or other points of initial receipt to operators' warehouses or places of business. Costs of unloading were not included in cartage but in the handling cost. Cartage costs were high in Dayton because few facilities had house tracks and only a few team tracks were nearby.

Part of the frozen food was carted just across a street from terminal tracks to a refrigerated warehouse where two food firms had facilities.

Cartage of meat was low because Dayton is located in a meat producing area and a large proportion came directly by truck from processors to wholesalers inside or outside the city. Frozen seafood was included in the cartage of frozen foods instead of in cartage of meat and related products.

About 57 percent of the rail receipts of fruits and vegetables was carted. About 33 percent of the grocery receipts and 40 percent of dairy products arriving by rail were carted. Since all eggs were received at dealers' warehouses, no cartage was involved.

The total cost of cartage for all commodities was about $102,000, or about $3.47 per ton.

Handling

Handling included unloading commodities from a truck or railcar at the wholesale store, moving commodities into and within the store, sorting, assembling, and preparing them for loading, and loading them onto a

TABLE 7.–Estimated costs of cartage; handling; transfers; spoilage, deterioration, breakage, and shrinkage; and rentals incurred by independent food firms, by commodity group, Dayton, 1964.

Cost item and commodity group	Volume involved[1]	Cost	
		Per ton	Total
CARTAGE	*Tons*	*Dollars*	*Dollars*
Fresh fruits and vegetables	4,674	3.96	18,509
Meat and related products	2,013	3.79	7,629
Dairy products and eggs	456	3.22	1,466
Groceries	10,946	3.65	39,964
Frozen foods	11,422	3.05	34,837
Total or average	29,511	3.47	102,405
HANDLING			
Fresh fruits and vegetables	66,777	6.37	425,369
Meat and related products	42,581	16.43	699,606
Dairy products and eggs	24,922	6.71	167,227
Groceries	104,654	7.40	774,440
Frozen foods	36,826	8.23	303,077
Total or average	275,760	8.59	2,369,719
TRANSFERS			
Fresh fruits and vegetables	16,830	3.27	55,034
Meat and related products	10,576	3.19	33,737
Dairy products and eggs	5,828	2.52	14,687
Groceries	3,544	2.98	10,561
Frozen foods	6,294	3.12	19,637
Total or average	43,072	3.10	133,656
SPOILAGE, DETERIORATION, BREAKAGE, AND SHRINKAGE			
Fresh fruits and vegetables	55,494	3.43	190,314
Meat and related products	37,032	5.63	208,647
Dairy products and eggs	21,861	2.99	65,545
Groceries	103,480	1.52	156,981
Frozen foods	35,195	2.85	100,167
Total or average	253,062	2.85	721,654
RENTALS			
Fresh fruits and vegetables	55,494	2.22	123,342
Meat and related products	37,032	5.61	207,928
Dairy products and eggs	21,861	2.20	48,100
Groceries	103,480	2.64	273,773
Frozen foods	35,195	3.30	116,040
Total or average	253,062	3.04	769,183
TOTAL, ALL COST ITEMS			
Fresh fruits and vegetables	55,494	14.64	812,568
Meat and related products	37,032	31.26	1,157,547
Dairy products and eggs	21,861	13.59	297,025
Groceries	103,480	12.13	1,255,719
Frozen foods	35,195	16.30	573,758
Total or average	253,062	16.19	4,096,617

[1] Includes direct receipts by independent food firms only.

truck for delivery. When truck drivers assisted in unloading and loading, the value of their services was included as a cost regardless of who employed them. Handling cost for all commodities totaled $2,369,719, or $8.59 per ton (table 7).

The average cost of handling fruits and vegetables—$6.37 per ton—was the lowest for any commodity group studied.

The cost per ton of handling meat was almost three times as great as that of fruits and vegetables. These costs are unusually high because of high labor cost, number of times handled, and inefficient facilities.

Handling about 105,000 tons of groceries costs slightly over three-quarters of a million dollars. The average cost per ton, $7.40, was moderate for this commodity group.

Cost of handling frozen food was $8.23 and dairy products $6.71 per ton. Total costs for handling these two commodities were just slightly less than one-half million dollars.

Transfers

The total cost of transferring 43,072 tons of food products among dealers was $133,656 (table 7). The cost of transferring products varied between $2.52 and $3.27 per ton. Several dealers, because they lacked house tracks or refrigerated rooms or efficient facilities, purchased products from other dealers rather than obtain them direct from producing or processing areas.

Spoilage, Deterioration, Breakage, and Shrinkage

Costs of spoilage, deterioration, breakage, and shrinkage were estimated for the various commodities. Many of these costs would have been materially reduced if there had been less handling or if handling methods had been improved. Little could be done, however, to reduce the costs in facilities that did not lend themselves either to protection or refrigeration of products.

Costs were computed from estimates given by local food firms and confirmed by records of a sample of dealers. The average cost amounted to $2.85 per ton.

The total cost of spoilage, deterioration, breakage, and shrinkage for all independent food dealers was about $721,700.

Rentals

The actual rent paid by individual wholesalers varied substantially. Most dealers who owned their own facilities had no accurate means of estimating a reasonable rental value of their property. Therefore, the average rental for similar property was assumed to apply.

Frozen food operators paid $1.98 per square foot for the space used in their operations. This amounted to $3.30 per ton of product handled. On the other hand, fruit and vegetable operators paid $1.14 per square foot or $2.22 per ton. A detailed breakdown by commodity is shown in table 7. For each commodity group, rental cost per square foot was computed on the basis of space used rather than on space occupied to place the figures on a comparable basis with space required in a new food center.

Annual rent for all food handlers was estimated at $769,183, or an average of $1.24 per square foot. This rent was paid by the 65 food dealers and did not include rent for brokers' offices, farmers' stalls, or similar facilities.

Summary of Costs

Total selected marketing cost for handling 253,062 tons of food commodities was $4,096,617, or an average of $16.19 per ton. The cost of handling meat and related products was $31.26 per ton—the highest of all commodities—and groceries, $12.13 per ton—the lowest. For the other commodity groups, these costs amounted to $14.64 for fruits and vegetables, $13.59 for dairy products and eggs, and $16.30 for frozen foods.

Deficiencies of the Food Market

Dayton has only one concentrated food market and it is solely a fresh fruit and vegetable market. Of the 65 food firms in the Dayton area, eight are located in this market. The firms who distribute here and in other Dayton areas are deprived of opportunities, such as cooperative purchasing and the convenience of sharing in distribution functions, that are afforded to operators in a unified market or food distribution center.

Because of outmoded facilities and inefficient methods of handling in this market, costs were higher than necessary. The lack of direct rail connections and platforms of proper heights and widths for loading and unloading and inefficient store layouts also contributed to the needlessly high cost of operations. The same products were often moved several times because of inadequate space within the stores. In most facilities, modern materials-handling equipment was virtually nonexistent because of restrictions in building layout. When trucks cannot move into the market area because of traffic congestion, or are restricted in their movement by traffic regulations, porters must be dispatched some distance with handtruck loads to the buyers' vehicles. Food firms here cannot be competitive with firms elsewhere who have more modern up-to-date operations and practices.

Receivers who supply foods to smaller dealers, such as jobbers, purveyors, and specialists, have to deliver from one side of the city to the other instead of to a common market area.

Much of the food that came into Dayton had to be carted to food firms' stores as few dealers had house tracks. Occasionally, rail shipments were received at public warehouses and carted to the customers as needed. Extra handling requires more storage fees in addition to the cost of loading, carting to, and unloading at the facilities. Unnecessary handling increases the possibility of damage to the merchandise.

Working conditions in many of the facilities were substandard for the industry. Many of the problems would be alleviated if the markets were pleasant places to work. Some facilities lacked even the most modest comforts and conveniences. The environment, in and around the facilities, was far from pleasant and attractive. Many of the buildings were old and weatherworn. Some were so deteriorated that employees worked under unsafe conditions. Many facilities had crowded work areas and lighting was bad. Many were dirty; few had proper facilities for cleaning; and many had equipment that could not be cleaned even if proper cleaning facilities and equipment were available. Because of long workdays and lack of coordination, these markets remained open many unnecessary hours.

Although time lost due to traffic congestion was minor, time lost due to lack of loading docks and parking spaces and the distances between facilities was substantial. Occasionally traffic became tied up when a trailer truck was being positioned at a platform or unloading area.

HOW THE FOOD MARKET CAN BE IMPROVED

Many inadequacies exist that make marketing costs excessive and prevent the expeditious and efficient handling of the food items. Although these inadequacies do not apply to every dealer, they are prevalent among many.

An attempt to improve the existing facilities would be fruitless. The building, the arrangement of space within the buildings, and the surrounding service approaches would still remain inadequate. Moreover, improving present facilities, which are scattered throughout the city, could not substitute for a centralized market, where both buyers and sellers could profit from exchange of price-making information. The best solution is to build a new food distribution center at a suitable location.

Factors to Consider in Planning a Market

In planning new facilities for the food industry in Dayton, several factors must be evaluated. What kind of market is needed? How should it be designed, constructed, equipped, and operated to correct the inadequacies of the existing market and provide for efficient distribution of food products? Essentials of a food distribution center that should be considered are completeness, adequacy, suitable arrangement of facilities, proper location of the market, sufficient land at reasonable cost, and sound management.

Completeness

A food distribution center should accommodate all food firms who may need new facilities. Space should be provided for all types and kinds of food marketing firms as well as for allied interests.

When dealers in all kinds of food are located in one concentrated market area, a complete line of products can be available at one place to retail outlets or be picked up readily by buyers. In addition, a complete line can be offered by large receivers serving small food handlers. Buyers will no longer need to drive all over the city to purchase their needs.

Obtaining fill-ins for shortages can be simplified and expenses cut by joint purchasing at the same time reducing the danger of spoilage of excessive stocks.

Adequate Facilities

The buildings should be designed and arranged to facilitate the flow of products into, through, and out of the facility. Different amounts of space and types of facilities would be required for large volume and small volume handlers and specialists. The buildings should provide ample space for unloading, display, protection, and the sale of supplies and they should have both front and rear platforms.

One-story buildings are essential in the efficient handling of food. House tracks at the rear of buildings are necessary for receiving supplies directly by railroad. Rear platforms should be level with railcar floor racks and front platforms at trailer-truckbed level. Both platforms should be protected from inclement weather by canopies. Such facilities permit ready loading, unloading, and movement of pallet loads into the building with powered equipment on unobstructed concrete floors. Certain buildings should have mezzanine offices to allow full use of the first floor space for product-handling operations.

Suitable Arrangement of Facilities

The layout of a food market should provide proper arrangement of the facilities on a site. Facilities for each group of food commodities should be in separate sections of the site. When facilities are few, this may not be entirely practicable. Local building codes should be reviewed before construction along with other laws such as those prescribed by Federal meat regulations.

The layout should provide an expansion area for each building and for each commodity group. A separate area should be reserved for service buildings and other allied industries, such as bakers, food processors, soft drink bottlers, milk distributors, truckers, general warehousers, and equipment wholesalers, that may desire to locate in the distribution center.

Proper Location

Several factors must be considered in selecting a location for a food distribution center. A convenient, potential rail connection is essential, preferably one that will enable all carriers serving the city to switch into the area. The site should be readily accessible to interstate expressways and other important highways or city thoroughfares. It should be close to the center of distribution of retail outlets and the center of population. Such a location permits moving supplies as short a distance as possible when distributing from the market.

Reasonable Land Cost

Economic factors point to acquiring all the necessary land at one time. If land for a market site were to be acquired gradually as needed, adjacent parcels might go up in value and additional land could only be acquired at higher prices. Land is needed for more than just one kind or one group of food firms. Wide streets and paved parking areas are needed for even a small market. But when more tenants and more food distributors share an area of land, the cost is spread more and the complete investment can be amortized more easily. In addition, rentals required would be correspondingly lower. The market should be located outside congested traffic areas and where costs of land are low.

When land is appraised for a market site, such items as availability, soil-bearing capacity, drainage, initial cost, costs of demolishing buildings on the site and grading, obtaining utilities, and other preparation costs necessary before construction should be considered.

Sound Management

Good management is important in a new market. Regardless of design or location, the market cannot function properly if it is not well managed. Management should not discriminate against any type of dealer or buyer, or any form of transportation or delivery of products from any shipping point. It should be devoted to the well-being and advancement of all businesses using the market.

Dealers who operate within the market should be allowed as much individual initiative in conducting their business as possible. However, the market management should have the power to assist the industry in enforcing desirable regulations. Its board of directors, or other policy-making agency, should be interested not simply in the financial success of the center but also in the welfare of shippers, dealers, buyers, transportation companies, and others doing business there.

Facilities and Acreage Needed for a Food Distribution Center

The facilities recommended in this report are based on the volume of food handled by the food dealers who would benefit by moving to new facilities or who, because of other reasons, may have to relocate.

The facilities actually planned for in a food center should be determined by the number of responsible food firms who would sign firm leases or who would construct buildings in the center. This precaution is necessary to prevent overbuilding or underbuilding and to insure occupancy of the facilities constructed.

Some firms would not be expected to relocate at the outset because they already have modern, well-located structures. However, even though their facilities are new, the rapidly changing aspects of food merchandising may eventually induce them to seek space in the food center. Other firms, because of present leases and other considerations, could ask to be included in the food center at a later date. Consequently, facilities other than those specified herein may be needed.

Two types of buildings needed for dealers locating in the new food distribution center are multiple-occupancy buildings for small-volume dealers and single-occupancy buildings for large-volume dealers.

A multiple-occupancy building consists of a row of individual units with a single-story operating area and a second floor or mezzanine. The units may vary in width; generally they are 100 feet in depth. This type of building combines the advantages of low-cost construction with the high versatility required for handling fast-moving food commodities. Such structures, with continuous front and rear platforms, provide convenience for interdealer transfers and for buyers who shop the market.

Space recommendations were based more upon volume handled than the number of dealers who can be expected to relocate. Temporary or removable partitions are recommended between units of the multiple-occupancy buildings to allow for adjustments in individual firm floor space requirements. Recommendations for certain details in design of multiple-occupancy buildings and layouts of store units are given in the following sections.

Facilities in a new food distribution center are proposed for 35 independent dealers. These 35 dealers received 170,969 tons of food in 1964. Table 8 shows the number of dealers, volume of receipts, and number and type of buildings recommended for each commodity group. A farmers' market shed with 20 stalls is recommended for the farmers now operating in the Midcity market area. The new market should also include in its initial construction:

TABLE 8.–Number of dealers expected to relocate in a new food distribution center in Dayton, their volume of receipts in 1964, and buildings recommended

Food group	Dealers	Volume received in 1964	Buildings		
			Multiple-occupancy		Single-occupancy
	Number	*Tons*	*Buildings*	*Units*	*Buildings*
Fruits and vegetables	11	47,150	1	[1] 18	–
Meat and related products	7	32,294	[2] 1	10	–
Dairy products and eggs	4	12,225	([2])	6	
Groceries	5	55,125	1	7	[3] 1
Frozen foods	8	24,175	1	15	–
Total	35	170,969	4	56	1

[1] 1 unit to be used as a restaurant.
[2] This building would house both meat dealers and dairy and egg dealers.
[3] For a food firm needing a single-occupancy building because of large volume or special needs.

(1) Rail tracks behind buildings.

(2) A restaurant in one multiple-occupancy unit.

(3) Paved streets at least 200 feet wide where buildings face each other, and service or cross streets at least 50 feet wide.

(4) Ample parking areas for patrons and employees of the market.

(5) An area for expansion and for allied industries to permit construction of additional buildings and service facilities as required.

The specific requirements for each food commodity group are discussed in the following sections.

Fruits and Vegetables

Multiple-occupancy building.–Of the 19 fruit and vegetable dealers in the Dayton area, 11 of them needed new facilities. While nearly all the dealers might benefit from having new facilities, these 11 are severely handicapped in their present facilities or must relocate because of redevelopment plans. All eight operators in the Midcity market area are included in this group. A multiple-occupancy building is proposed to contain 18 units, of which 17 are for the 11 dealers who handled 47,150 tons of direct receipts in 1964 (table 8). The other unit would be used for a restaurant.

Each fruit and vegetable unit should be 25 by 100 feet. Enclosed space should be 25 feet wide and 72 feet deep and have a ceiling height of at least 21 feet. Front and rear platforms, 14 feet deep, extend the entire length of the building. A layout and cross section of one unit and a perspective of the building are shown in figure 5. Partitions should be removable to provide for future adjustments of space among firms. These partitions should be constructed of waterproof and incombustible materials. The building would be 450 feet long. All units should have mezzanines, 14 feet deep by 25 feet wide, over the front platform. A roof should extend 6 feet beyond the edge of the front platform to protect both workers and merchandise during inclement weather.

Each unit would contain 1,800 square feet of enclosed first floor space and 700 square feet of open platform space. The mezzanine over the front platform would contain 350 square feet of floor space. This would provide 2,850 square feet of floor space for each unit. The 17 units for the fruit and vegetable dealers would total 48,450 square feet of space.

The platforms and floors should be on the same level. Surfaces of the main floors and platforms should be made of nonskid concrete and sloped to floor drains or toward the outside. Floors and platforms should be designed for a live load of about 400 pounds per square foot. The mezzanine would be designed for a safe load of at least 100 pounds per square foot.

The front platform should be at truck-bed height, about 45 inches above grade, with partially recessed steps at every fourth unit. The rear platform should coincide with the usual height of floor racks in refrigerated cars, about 55 inches above street level. Vertical rubber bumpers should be attached to the edge of the platforms to protect them from damage by impact of trucks.

The front doorway should be 8 feet wide with an overhead door. A rear doorway, 6 feet wide, should have double-acting doors. A walk-in door at the front of each unit would permit easy access for workers and buyers.

Heat would be supplied by gas or electric space units. The necessary refrigeration capacity should be installed at the discretion of the individual food firms since individual requirements vary. A room for refrigeration equipment is provided under the rear platform.

Nonrefrigerated space should have sufficient ventilation to supply fresh air, exhaust heat and gases in warm weather, and prevent condensation in cool weather.

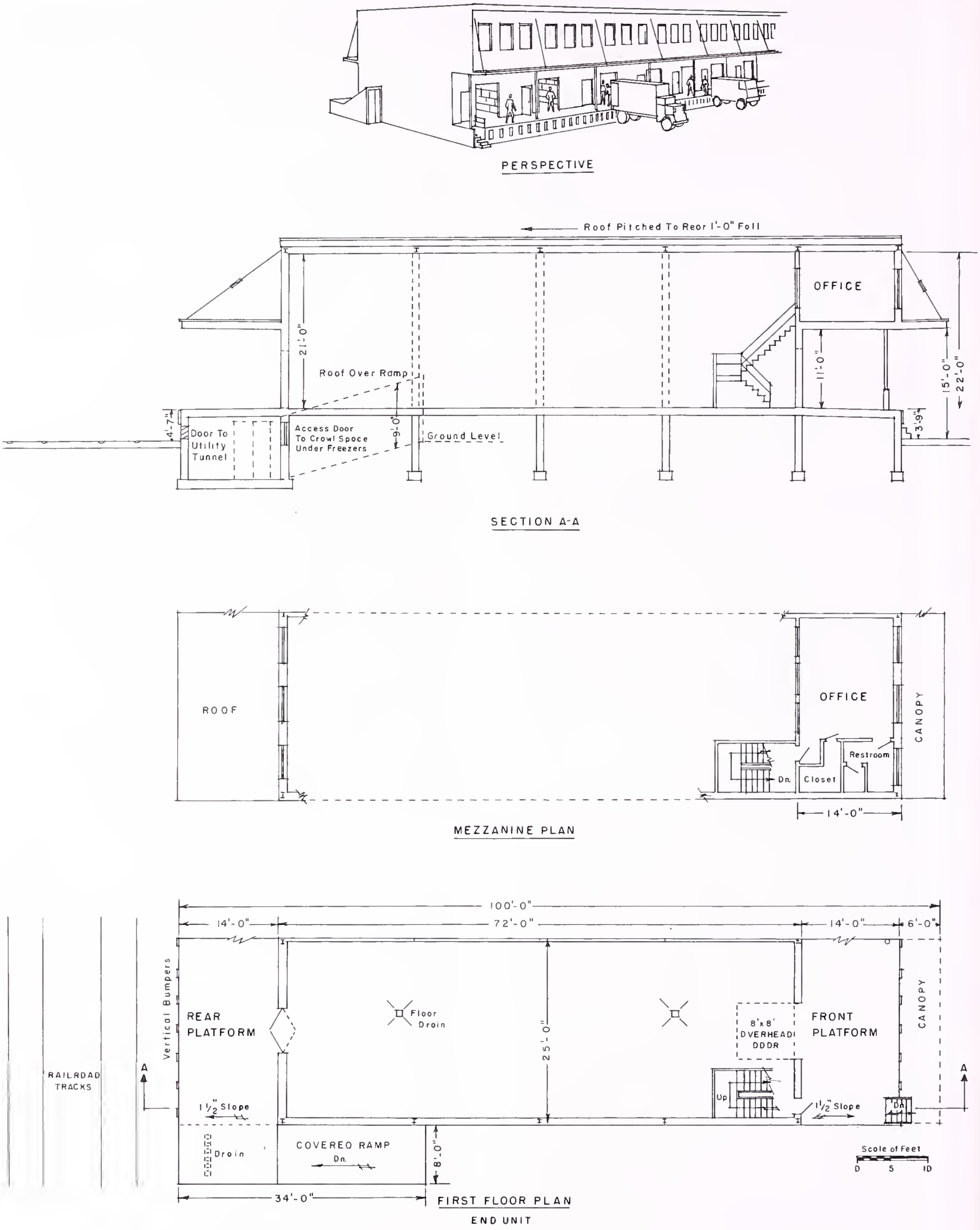


Figure 5.–Layout and cross section of a fruit and vegetable unit and a perspective of the multiple-occupancy building.

Good interior lighting is essential. Sufficient electrical outlets and controls should be installed to permit the use of electric power equipment, such as portable conveyors, and to satisfy the need for special appliances and industrial equipment.

The pavement at the rear of the building should be flush with the top of the rail tracks. This will allow trucks to move over them when the rear platform is being used for receiving or shipping by trucks. Refrigerated railcars, located here, can provide temporary additional cooler space, or they can be unloaded directly into the store or delivery trucks.

The farmers' market shed.–One sales shed containing 20 stalls is recommended to handle the 4,159 tons supplied by farmers and local producers to the market. The present tonnage is entirely fruits and vegetables, but it could be expanded to include other commodities. While all the tonnage is sold only to dealers now, farmers might be able to sell their surplus stocks to others. Figure 6 shows the design of farmers' market structure.

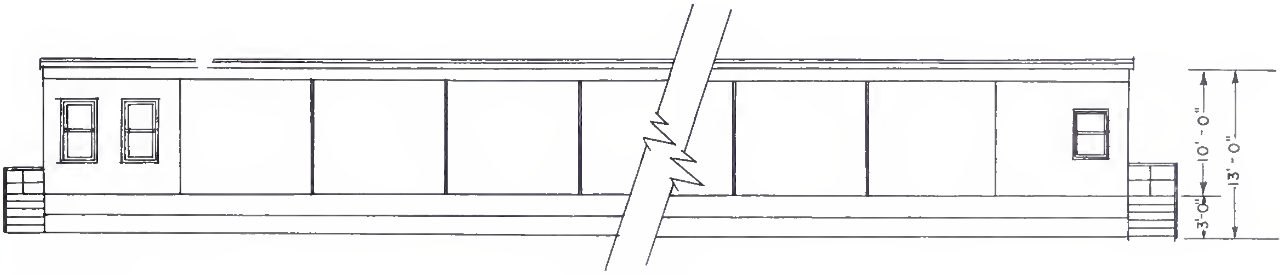
The complete shed structure would be 200 feet long with a 13-foot-high roof covering a concrete platform. The platform should be 36 inches above the street level to accommodate smaller trucks and 10 feet wide with a nonskid surface. A continuous step 24 inches wide and 18 inches high should be constructed along one side of the platform to permit ready access for buyers, increasing the overall width to 12 feet. The total surface for the platform, including the continuous step, is 2,400 square feet. Spaces 10 feet wide may be marked off on the platform to provide 20 stalls 10 by 12 feet, each 120 square feet.

A roof extending beyond the edges of the platform is desirable for protection of personnel and products from the weather. The column supports for the roof would be placed at 10-foot intervals in the center of the platform.

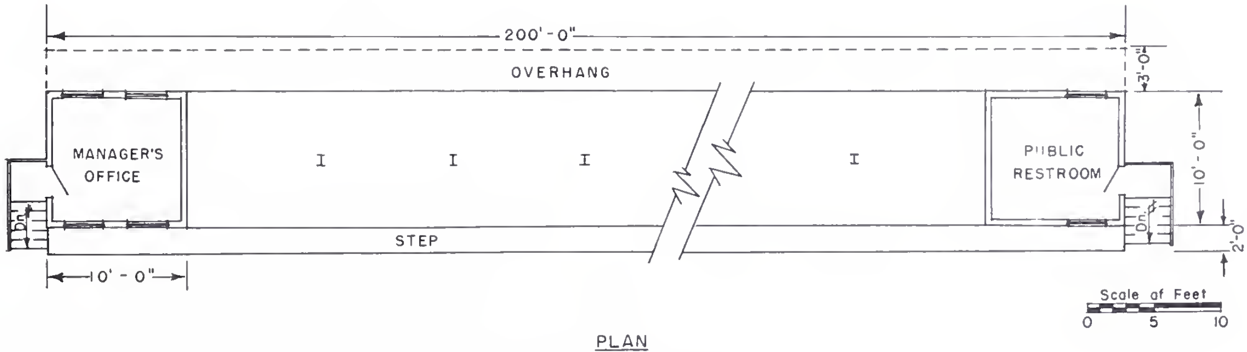
A 75-foot-wide driveway between the shed and a parking strip is recommended for buyers' vehicles. An 85-foot-wide street on the other side of the shed would permit farmers to back up trucks to their stalls.

Two of the twenty stalls would be enclosed–one for an office for the manager of the farmers' market and the other for a public restroom.

The total land required, including a 50-foot-wide margin on each end for approach and exit, would be 2.4 acres.



ELEVATION



PLAN

Figure 6.–Design of a farmers' market structure.

Ten units in a multiple-occupancy building are proposed for seven dealers who handle 32,294 tons annually (table 8). This building will also house dairy and egg products dealers. The part of the building housing meat operators will contain two floors and have house tracks at the rear. A layout of a meat unit is shown in figure 7.

The first floor of each unit is 25 feet wide and 100 feet deep, including a 14-foot-deep covered platform at the front 45 inches above the ground and a similar platform at the rear 55 inches high. The dimensions of the second floor are 25 by 72 feet. The minimum overall ceiling height of each unit is 21 feet above the surface of the first floor. Partitions between units should be removable to provide for future adjustments of space

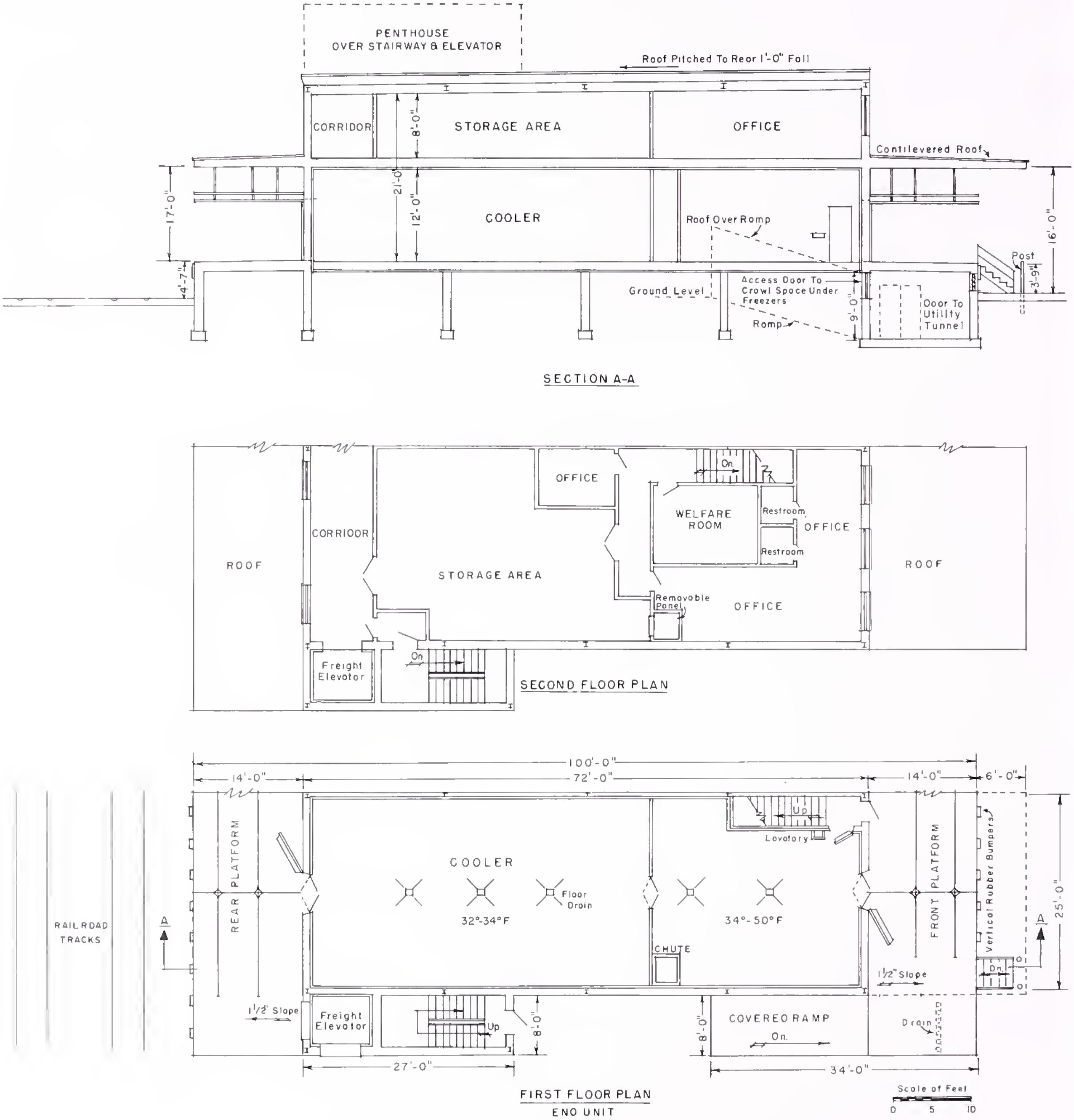


Figure 7.—Layout and cross section of a meat unit.

among firms. These partitions should be constructed of waterproof and incombustible materials.

Each unit contains 1,800 square feet of enclosed floor space on the first floor, 1,800 square feet on the second floor, and 700 square feet of platform space, for a total of 4,300 square feet. Total space for the 10 units is 43,000 square feet, of which 18,000 square feet is enclosed first-floor space.

Cantilevered roofs cover both platforms. The roof over the front platform should extend 6 feet beyond the edge of the platform to protect employees and products against inclement weather.

Steps to provide access to all meat units should be located every fourth unit along the front platform. Vertical rubber bumpers should be attached to the edge of both front and rear platforms, and the platforms should be sloped slightly toward the outside for drainage. The floors, including platforms, should have a nonskid surface. Meat rails should be installed on the platforms. The meat rails inside the individual stores would be furnished by the tenants to meet their individual needs. Some of the operators, especially those handling prepackaged meat, would not need a meat rail system.

Offices, light storage rooms, and a welfare area are planned for the second floor. A refrigeration or mechanical equipment room would be provided under the front platform. The refrigeration equipment and insulation would be furnished by the tenant.

First-floor space should be constructed either of vitrified brick of good quality, bonded with acid-resistant, waterproof mortar, and laid on a waterproof concrete base, or of dense acid-resistant waterproof concrete.[2] Floors should be well drained. One drainage inlet for each 400 square feet of enclosed space is satisfactory. Floors should slope to drains.

The first floor should be designed for a live load of 400 pounds per square foot. Second floors should be designed for a safe load of 100 pounds per square foot. Walls and ceilings should be finished in accordance with USDA Meat Inspection requirements and State and city sanitation department codes.

Sufficient hot water at about 180° F. should be supplied. Units requiring steam would supply their own needs.

Dairy Products and Eggs

Six units are provided in the meat and related products building for four operators who handle 12,225 tons of dairy products and eggs. These units do not require house tracks because so little of the commodity group comes by railcar.

The six units have mezzanines over the front platform like those in the fruit and vegetable multiple-occupancy buildings (fig. 5).

Each unit is 25 feet wide and 100 feet deep, including front and rear 14-foot-deep platforms. The front platform is 45 inches above ground level and the rear platform, 55 inches. The enclosed space is 72 feet deep and ceiling height is a minimum of 21 feet.

Each unit contains 1,800 square feet of enclosed first-floor space, 700 square feet of platforms, and 350 square feet of mezzanine. Each unit contains 2,850 square feet, and the six units contain 17,100 square feet.

Groceries

Four independent grocery dealers need seven store units in a multiple-occupancy building. One single-occupancy building is needed for a high-volume, special-purpose independent grocery firm. Direct receipts of the five dealers were 55,125 tons in 1964.

Multiple-occupancy building.—Each unit of the multiple-occupancy building is 25 feet wide and 100 feet deep with a minimum ceiling height of 21 feet (fig. 8). There is a 14-foot-deep platform in the rear of the building, but none in front. As grocery warehousing requires high pallet tiering by lift trucks direct from trucks at front entrances, a maximum amount of enclosed space is desirable. A 17-foot mezzanine is placed above an order assembly area at the front of the unit.

The rear platform should be 45 inches above the tracks because the freight cars used in transporting groceries are not refrigerated and require a platform height of 45 inches. The front platform should also be 45 inches above ground level, which is a common truck-bed height. Vertical rubber bumpers should be placed at the front entrances and along the platform at the rear. The front and rear overhead doors should be 8 feet wide.

Removable partitions are recommended to provide for changes in future space requirements of individual food firms. Offices or light storage rooms are located on the mezzanine over the order assembly area at the front of the building. Order assembly is located at the front of the unit under the mezzanine leaving the interior of the unit clear for pallet racks and high stacking.

The enclosed first floor area is 86 by 25 feet, and contains 2,150 square feet of floor space. The rear platform has 350 square feet. The mezzanine, 17 by 25 feet, has 425 square feet. Each unit contains a total of 2,925 square feet, and the total floor space in the building is 20,475 square feet.

Single-occupancy building.—An independent grocery firm handling a large tonnage of grocery products would need a total of 108,000 square feet of building space. A building 240 by 400 feet would provide 96,000 square feet of first-floor space. The partial second floor

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[2] U.S. Department of Agriculture. *U.S. Inspected Meat Processing Plants (No Slaughtering). A Guide to Construction, Equipment, and Layout.* 30 pp. 1961. (Out of print.)

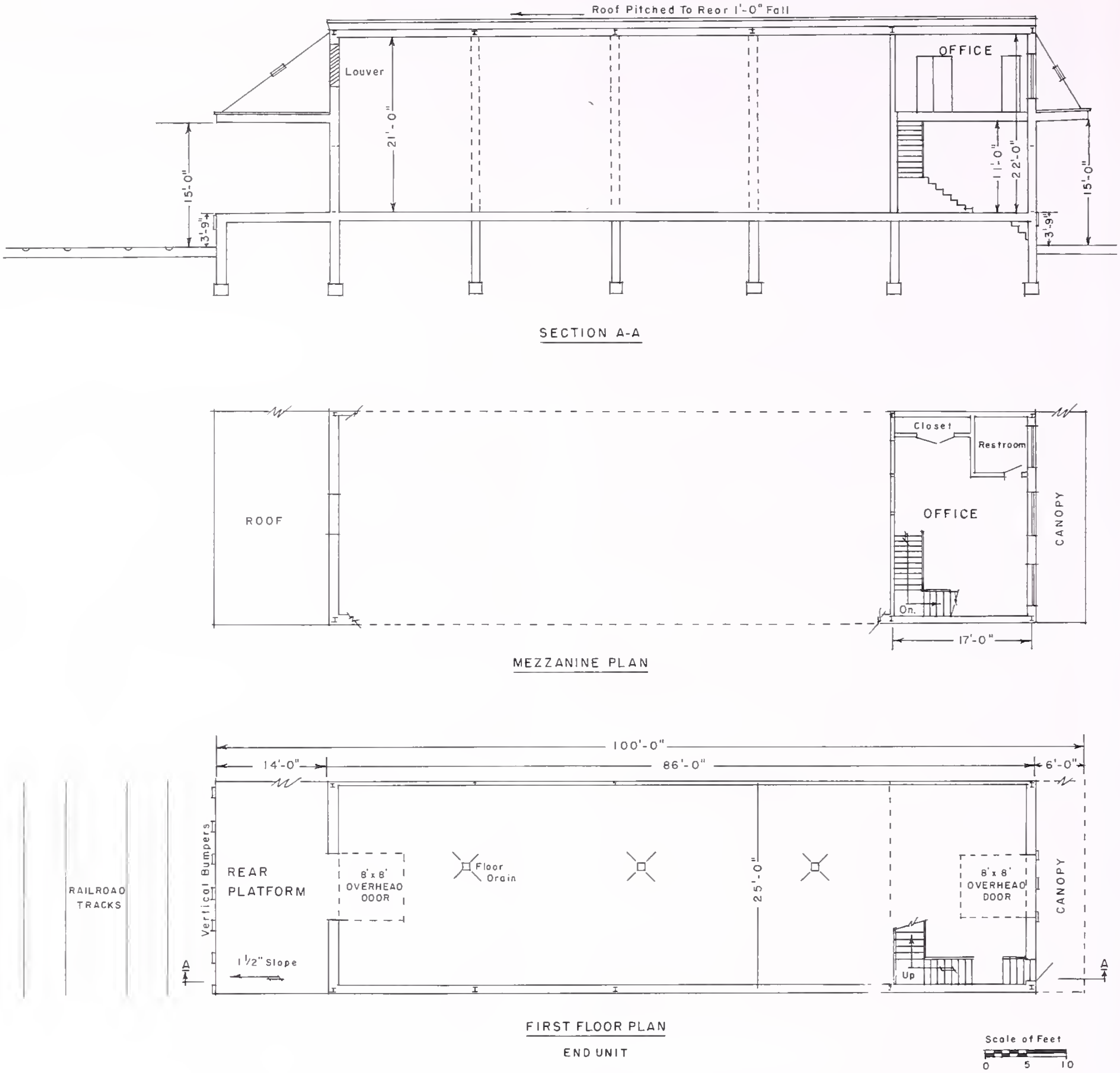

Figure 8.—Layout and cross section of a grocery unit.

or mezzanine over the shipping area at the front of the building would be 240 by 50 feet in depth and would provide 12,000 square feet of second-floor space for a total of 108,000 square feet of building space.

Frozen Foods

Independent frozen food wholesalers could be housed in a specially designed building, 160 by 375 feet, having a ceiling height of 26 feet in storage areas. This building has 15 units to meet the needs of eight dealers handling 24,175 tons. A layout of the building is shown in figure 9.

A single unit, 25 by 160 feet, contains 4,000 square feet of first-floor space of which the freezer room, 25 by 100 feet, takes 2,500 square feet. A 20-foot-deep, enclosed front platform has 500 square feet and an enclosed, 14-foot-deep rear platform, 350 square feet. A front 26-foot-deep assembly room has 650 square feet. In addition, a mezzanine over the front platform contains 500 square feet. The total per unit is 4,500 square feet. The facility is designed to provide room for a 40 to 50 percent increase in business volume.

Each unit can be refrigerated individually, or the building can be centrally refrigerated with the high-side equipment installed under the rear platform.

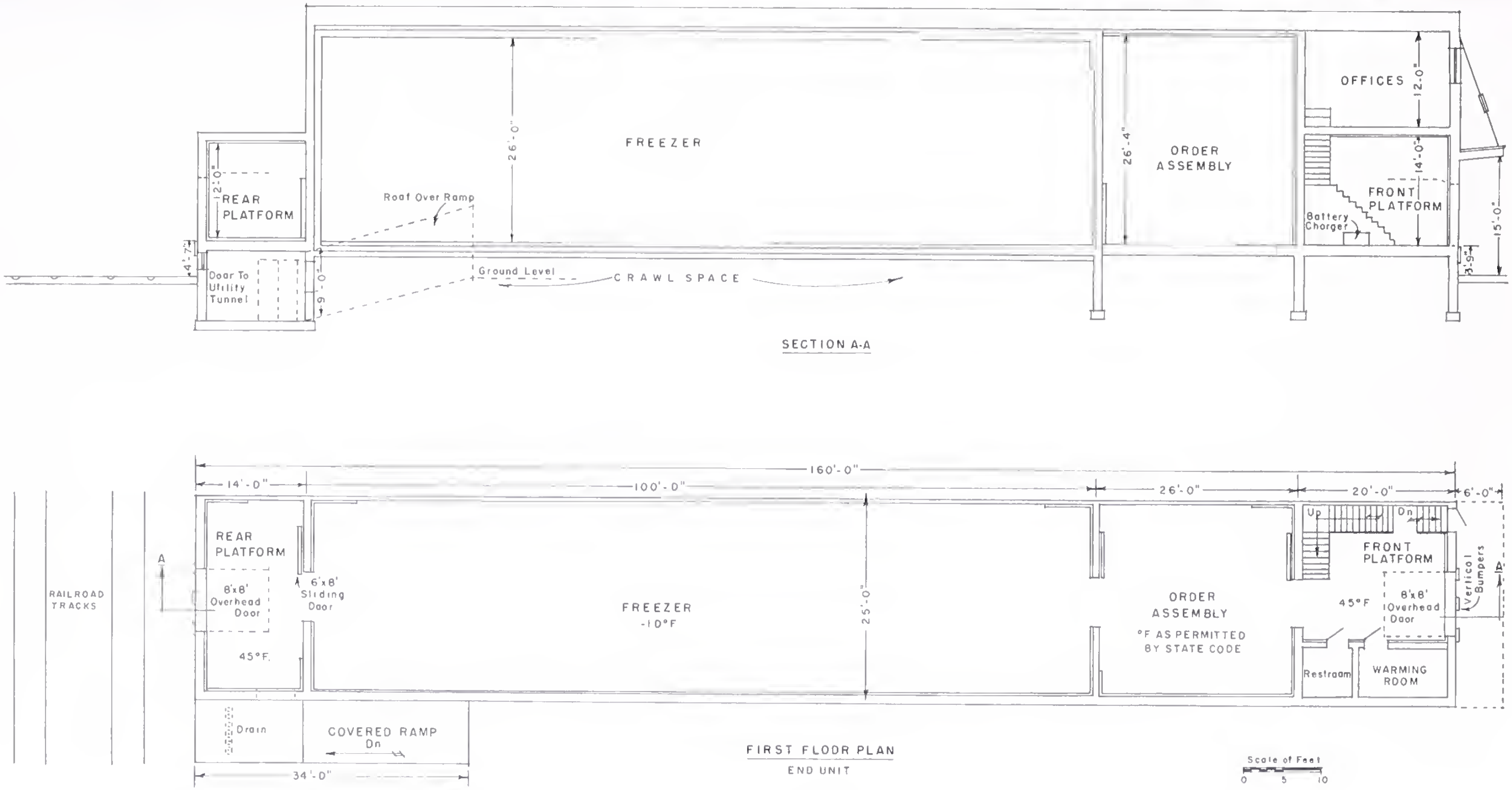

Figure 9.—Plan for a single unit of the frozen foods building.

Overhead-type refrigerator doors and seals should be provided at both the front and rear of the facilities to minimize the heat gain during loading or unloading operations. By controlling the temperature in the front and rear receiving and shipping areas, several advantages will be gained: (1) The need for separate vestibules may be eliminated; (2) heat gain will be reduced; (3) condensate formation on packages will be reduced; and (4) the possibility of frozen items thawing-out will be reduced.

The enclosed front platform area should have a warming room, restroom, battery charger, and stairway to the mezzanine. A battery charger can be placed under the stairs. Offices and the necessary welfare facilities are located on the mezzanine above the front platform.

An order assembly area is located between the front platform and the freezer room. Its temperature should be maintained in accordance with the State code for maximum temperature allowance in the construction of refrigerated warehouses. This is a transitory room and is not intended as a short-term storage area for frozen food. It can be used for such purposes as (1) assembling orders; (2) case-splitting operations; or (3) cooler for storing fresh produce and dairy products. The full 26-foot height can be utilized in assembling pallet loads.

The freezer room should be capable of maintaining a −10° F. temperature. The inside height of the freezer is 26 feet, which will permit pallet stacking four-high on pallet racks. A narrow-aisle forklift truck (requiring a 7-foot-6-inch aisle width) and drive-in pallet racks, can be used. A typical arrangement would be pallets two deep along both walls and three in the center of a 50-foot-wide double unit. The use of this equipment would permit efficient handling and space utilization.

Two-stage refrigeration systems could be used with refrigerant 12, with air-cooled or evaporative condensers and automatic hot gas defrosting. Blower units with circulating fans are recommended. Blowers should be properly located to provide even air distribution. Frost heaving of the freezer floor can be prevented by installing heating coils, or providing a heated crawl space under the floor insulation.

The building has a total of 67,500 square feet of floor space, of which 60,000 square feet is on the first floor and 7,500 square feet, mezzanine.

Rail Service, Streets, and Parking

House tracks should be provided at the rear of buildings for those dealers who need to receive by railroad. Double tracks are needed by all dealers except those handling dairy products and eggs. These dealers do not need house tracks because none of their receipts arrive by rail.

Streets and parking areas should comply with engineering specifications for the transportation of heavy loads. Streets should slope away from buildings to storm sewers for satisfactory drainage. Streets (including receiving and shipping areas at front platforms) that separate the rows of buildings should be at least 200 feet wide. This is wide enough to allow vehicles to maneuver to the buildings, to permit parking, and to provide for easy flow of traffic.

Two public restrooms should be provided, one under the restaurant in the fruit and vegetable building and another in an enclosed stall of the farmers' market.

Areas for Expansion and Allied Industry

Areas for expansion should be reserved at the outset so that more units may be added to each building as needed.

Space should also be reserved for allied industries such as bakeries, ice cream and other processing plants, fluid milk and beverage distributors, cartage and transfer companies, general warehousing, and other associated industries. The only restriction that should be placed on location in this area is that the industry be compatible with food industries. In other cities where new food markets have been built, the trend has been for many types of food handlers to relocate in the new market area over an extended period. Therefore, sufficient land must be set aside for expansion if Dayton is to have a central, unified food distribution center that is adequate for future needs.

Present and Recommended Floor Space for Tenants of Multiple-Occupancy Buildings

The floor space in multiple-occupancy buildings recommended for 34 independent dealers is 196,525 square feet. This includes 55 units in four multiple-occupancy buildings. One additional unit with 2,850 square feet (including a mezzanine) for a restaurant and one single-occupancy building for a large operator are proposed. The restaurant and single-occupancy building are not included in the comparison that follows, but in the section on cost estimates.

The total space proposed for multiple-occupancy buildings in a new food center is 68 percent of that presently occupied (table 9). The present space used for storage and distribution, excluding slaughtering and processing by seven meat and related products dealers, amounted to 116,650 square feet; 37 percent of this space would be sufficient in modern facilities for the same functions.

No more than 68 percent of the space presently used would be sufficient for fruit and vegetable dealers in a new market. Dairy products and egg dealers would need 87 percent of their present amount of space.

There was a shortage of space for frozen food dealers. These dealers need 8 percent more space than they now have. Grocery dealers would also need a little more space—about 2 percent more—than they presently have.

TABLE 9–Floor space occupied by 34 independent food dealers in 1964 and space proposed in multiple-occupancy buildings, by commodity group, Dayton

Commodity group	Dealers included	Floor space		Percentage proposed space is of present space
		Present	Proposed[1]	
	Number	*Square feet*	*Square feet*	*Percent*
Fruits and vegetables	11	70,912	48,450	68
Meat and related products	7	[2] 116,650	43,000	37
Dairy products and eggs[3]	4	19,700	17,100	87
Groceries	[4] 4	20,081	20,475	102
Frozen foods	8	62,256	67,500	108
Total	[4] 34	289,599	196,525	68

[1] Includes mezzanine and platform space.
[2] Does not include 65,000 square feet of processing space which would not be relocated.
[3] Part of meat and related products building.
[4] One dealer in a single-occupancy building not included.

Acreage Required for the Food Distribution Center

A total of 75 acres is required for the food distribution center, of which 33 acres are needed for the multiple-occupancy buildings, single-occupancy building, farmers' market, parking lots, streets, and railroads, and 42 acres, for allied industries.

By commodity groups, the acreage needed is as follows:

	Acres
Multiple-occupancy buildings:	
Fruits and vegetables and restaurant	5.5
Meats, dairy products, and eggs	5.3
Groceries	3.8
Frozen foods	8.6
Farmers' market	2.4
Single-occupancy grocery building	7.4

Arrangement of Facilities in the Food Distribution Center

The facilities in the food distribution center should be arranged so that handling operations, transportation, and distribution will be functionally coordinated. A master plan should be adopted at the outset so that the first buildings constructed will not interfere with the orderly development of the remaining areas. It should be planned to meet all needs of sellers and distributors and attract buyers from a greater radius.

In developing a food distribution center, the functions to be performed should be examined in detail. The volume of the different commodities to be handled, the space required for each type of food, and the methods of conducting the businesses of the food firms should be carefully examined with a view to proper arrangement.

A layout of the facilities on the Needmore site, a site evaluated in this report (see section, "Sites Evaluated"), illustrates the principles of suitable arrangement (fig. 10). The use of the Needmore site is not intended to influence the final selection of the market site. A similar arrangement is possible on any of the sites evaluated.

The layout has been planned so that the facilities initially constructed will form a compact unit and any segment can be expanded without interfering with the unity of any other segment. Buildings have been located so they can be served by railroad. The rail spurs have been arranged with a minimum of trackage and switches. The streets have been designed to minimize traffic problems and to isolate the site from nonmarket traffic, while at the same time easing the approach of essential traffic to the market.

The objective of the food center design is a one-stop buyers' market. Attention has been directed to the consolidated merchandising of all kinds of food that are usually sold in a retail grocery store. Buyers should not need to visit, or to receive deliveries from, any markets outside the food center to purchase a complete line.

The fruit and vegetable facilities are placed at the edge of the site near the main access road, because much of their business is done by buyers shopping the market.

The farmers' market would be located near the fruit and vegetable section, since its customers are mainly fruit and vegetable dealers. The produce growers are predominantly farmer-dealers, but they may sell some merchandise to others after regular marketing hours. Parking space is adjacent.

The area for meat and related products is near the fruit and vegetable section. Restaurant proprietors and others coming to the market to select fresh produce may pick up their meat at the same time, thus avoiding the

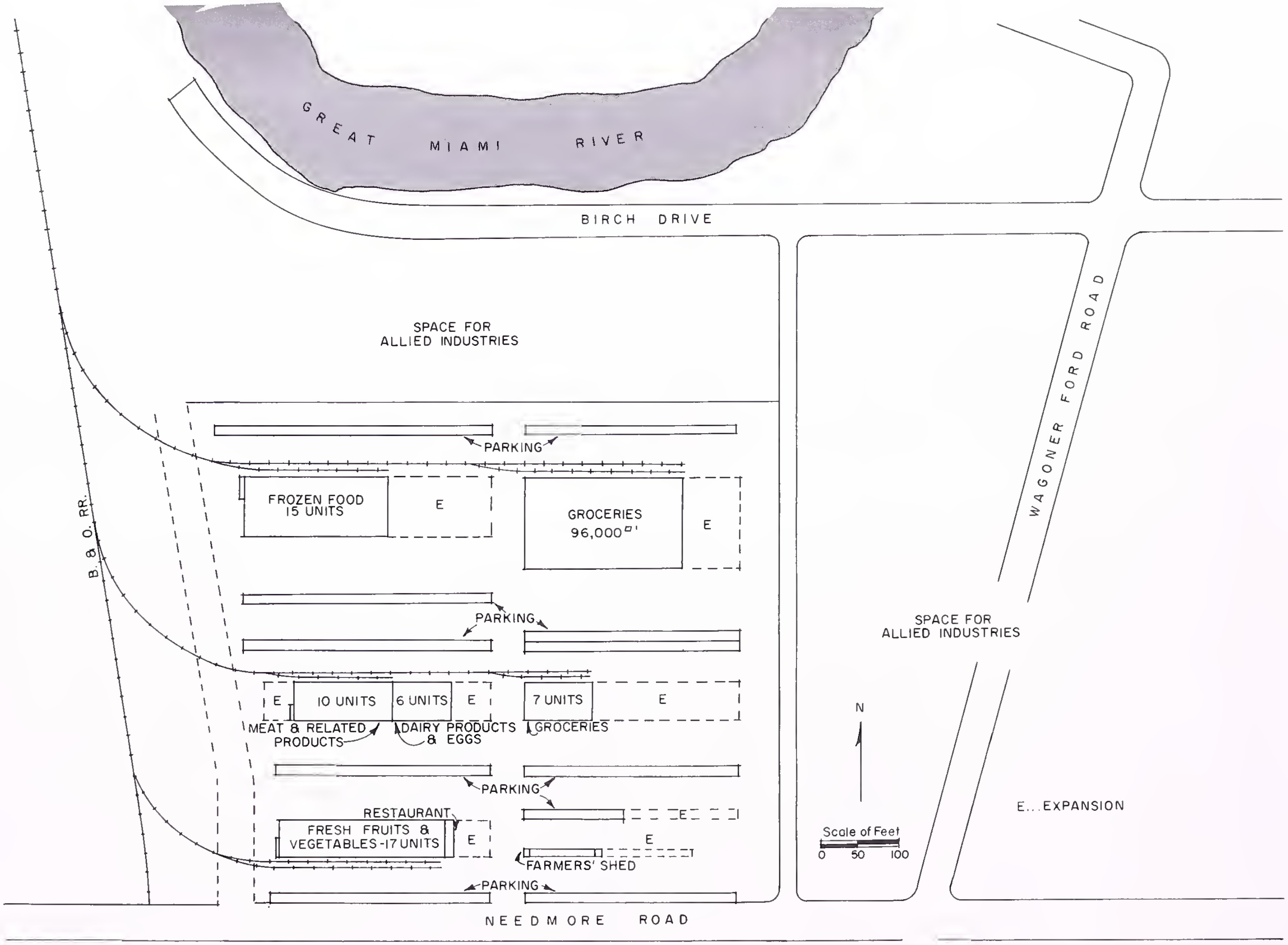

Figure 10.—Layout of a food distribution center for Dayton on the Needmore site.

heavier market traffic. House tracks are extended to the building for service by railroads. Parking space is provided in the center of the street that separates the facing buildings.

The store units for dairy products and egg dealers are in the same building as the units for meat dealers. It is more feasible to house these two together in one large building than to build two small buildings for them.

Grocery dealers almost universally deliver to their customers on the basis of advance orders that are obtained either by salesmen or by telephone. If the grocery facilities were somewhat isolated from the others, their delivery trucks would not interfere with, nor be obstructed by, other market traffic. This would also apply to frozen food dealers.

The building plan for frozen food dealers is pointed toward the merchandising of convenience foods rather than for storing frozen foods for long periods.

The master plan includes a section for industries associated with the food distribution business. Building details cannot be known because the dealers who someday would be in the allied industry section cannot be foreseen.

Selecting a Site for the Food Distribution Center

In choosing a site of sufficient acreage for the food distribution center, the principal factors to be considered are (1) convenience to retail outlets, (2) direction of population growth, (3) accessibility for truck and rail transportation, (4) convenience to local growers, (5) accessibility of public utilities, (6) availability and cost of land, and (7) avoidance of nonmarket traffic.

Convenience to Retail Outlets

The center of distribution in Dayton is in the vicinity of West First and Ludlow Streets. A food distribution center should be located as close as possible to a point where a minimum of time is required to deliver to buyers or for buyers to reach the market, obtain their supplies, and return to their stores.

Although it is not economically possible to locate a food distribution facility at the intersection of West First and Ludlow Streets, a suitable site should be found that is not too distant from here.

Direction of Population Growth

Montgomery County with about 525,000 consumers is the immediate area serviced by Dayton food firms. In 1960, the city of Dayton had a population of 262,332 and the Standard Metropolitan Statistical Area, which includes Montgomery, Miami, and Greene Counties, 694,623.

The population of Montgomery County in 1960 had increased 32 percent over 1950 and 78 percent over 1940.

In 1965, the Dayton Area Chamber of Commerce estimated the Montgomery County population at 600,000, more than double 25 years previously. The population is predicted to increase approximately 100,000 in each of the 5-year periods from 1965 to 1975.

From 1940 to 1960, the center of population of Dayton has moved less than one mile southward, from the vicinity of Broadway and Harvard Boulevard at Salem Avenue in 1940, to the area of Broadway and Edgewood Avenue in 1950, and to Dakota and Williams Streets in 1960.

Accessibility to Truck and Rail Transportation

Most of the food arriving in Dayton comes by truck from nearby cities and shipping points. Therefore, it is essential that any site selected be served by access routes that will easily, economically, and speedily place all the commodities on the roads to market.

The site selected should also be accessible to at least one of the four railroads serving Dayton, with nominal switching rates charged to the others. Also, cars destined for a food distribution center from distant shipping points should be delivered at common switching rates regardless of any established local switching limits.

Convenience to Local Growers

In 1964, local farmers supplied 23,788 tons of food, including that supplied from the farmers' market, directly to independent food firms in the Dayton area. This was 9.4 percent of the total receipts of independents. Local farmers supplied an unknown additional quantity to the several food chains and voluntary organizations outside this area.

Accessibility of Public Utilities

Availability of public utilities, including electricity, water, gas, telephone and sewage disposal, must be considered in appraising the suitability of a site. If they are not available on the site, it must be known at what point connections can be made, whether lines can be extended from there, and whether the utility service or the food center must pay for any extension of lines. Also, the developer should be aware whether a utility, such as a power line or sewer, presents a serious problem in the layout of a site or to the construction and operations of a market facility placed on the site.

Availability and Cost of Land

The cost of land for a food center is a prime measure in choosing a site. This cost includes not only the cost of the land, but also the cost of placing the land in condition to build, which could include removing buildings and other obstructions that are on the site, filling, grading, and other site preparation. It affects the total cost of the food center and the amount of rental income necessary to support the investment.

It is essential to obtain sufficient acreage in the beginning for all presently planned and possible future functions. Failure to purchase enough land at the outset could result in an expensive expansion program later.

A convenient location may have to be sacrificed if the price of land would cause rental charges to be excessively high, more than offsetting any savings in operating costs.

Current land use is an important consideration. A vacant area of the size required, with all the accommodations desired, is usually difficult to find. If the market sponsors decide to locate the food center in the midst of city activities, despite high land costs, traffic congestion, insufficient acreage, and many inconveniences, they still have the problems of assembling parcels of land and deciding what is to be done about existing improvements—whether property is to be condemned, and whether one usage is more essential to the public interest than another. If they agree to locate the center on the outskirts of the city where land is usually cheaper, where less use is made of the land, and where there are more equally acceptable areas, they will have fewer problems in acquiring land and preparing it for building. Any decision of the market sponsors in selecting a site will be based, to a large extent, on the overall cost of acquisition and operation (including debt service charges and taxes).

The topography could be such that the costs of filling, grading, and piling, if needed, would make the site uneconomical. The adaption of the facilities to the contours, terrain, and limits on the site should be thoroughly investigated.

An ideal site would be rectangular, with border streets and convenient utilities. Unfortunately, such sites are seldom available. The irregular outlines, the obstacles, the presence of brooks and rivers, the directions of streets and roads, the bridges, the turnpike exits, the elevations, and the approach of rail tracks, all affect the layout of facilities. When many of these conditions are extreme, a proper arrangement of facilities is impossible. The shape and appearance of the tract should be considered carefully for the costs of constructing a market on a poorly shaped one would be uneconomical.

The groups of food marketing facilities should be fitted into an area of similar functions. Therefore, the city zoning ordinances provide for the proper subdivision of activities into light industrial, commercial, and other categories of usage.

Avoidance of Nonmarket Traffic

Since the handling of food products through a food center involves a large amount of trucking of heavy and bulky items, the site selected for the center should be reasonably free of nonmarket traffic. If necessary, part of it may be fenced to lessen interference from such traffic.

Sites Evaluated

Several sites were suggested by various interested persons and groups in Dayton. The four that appeared to have the best potentials are evaluated here. They are the Needmore site in the northern part of the Dayton area, the West River land in the southern part of the city, the Woodman-Patterson tract at the eastern edge of the city, and the Marshall-Hempstead area in the Dayton-Kettering section of Montgomery County.

The Needmore site seemed well suited for a market center because of its size, location, level ground, accessibility, and cost. All four sites, however, are about equally acceptable and the order in which the sites are described is not intended to indicate an order of preference.

Figure 11 shows the location of these four sites, rail lines, and traffic arteries. An appraisal of each is given in table 10.

Needmore Site

This site is in Montgomery County, about a quarter of a mile north of the Dayton corporation line at the northern border of the Kitty Hawk Municipal Golf Course. It is less than a mile east of the Needmore Road exit from Interstate Route 75. It is bordered on the north by Birch Drive, on the south by Needmore Road, on the west by the Baltimore and Ohio Railroad, and on the east by a trailer court.

This area is level farmland. Some fill will be necessary for surface drainage, but will involve little cost. Comparatively little piling should be required for construction. All utilities are available.

Rail access can be easily obtained from the main line of the Baltimore and Ohio Railroad which passes the west edge of the site. Switching agreements should be consumated so that all rail lines might have access to the market.

Interstate Route 75 conducts traffic from west of the site through exits at Needmore Road. Interstate 70 is just a short distance to the north. An airport is nearby at Vandalia.

The tract is rectangular with no irregularities. About 80 acres are readily available with adjacent land available for expansion. At the time of the study, the cost of the land in condition to build was estimated at $1,263 per acre.

West River Site

West River site is a large tract of land within the Dayton corporation line at the south side of the city. It is located north of Stony Hollow Road between West

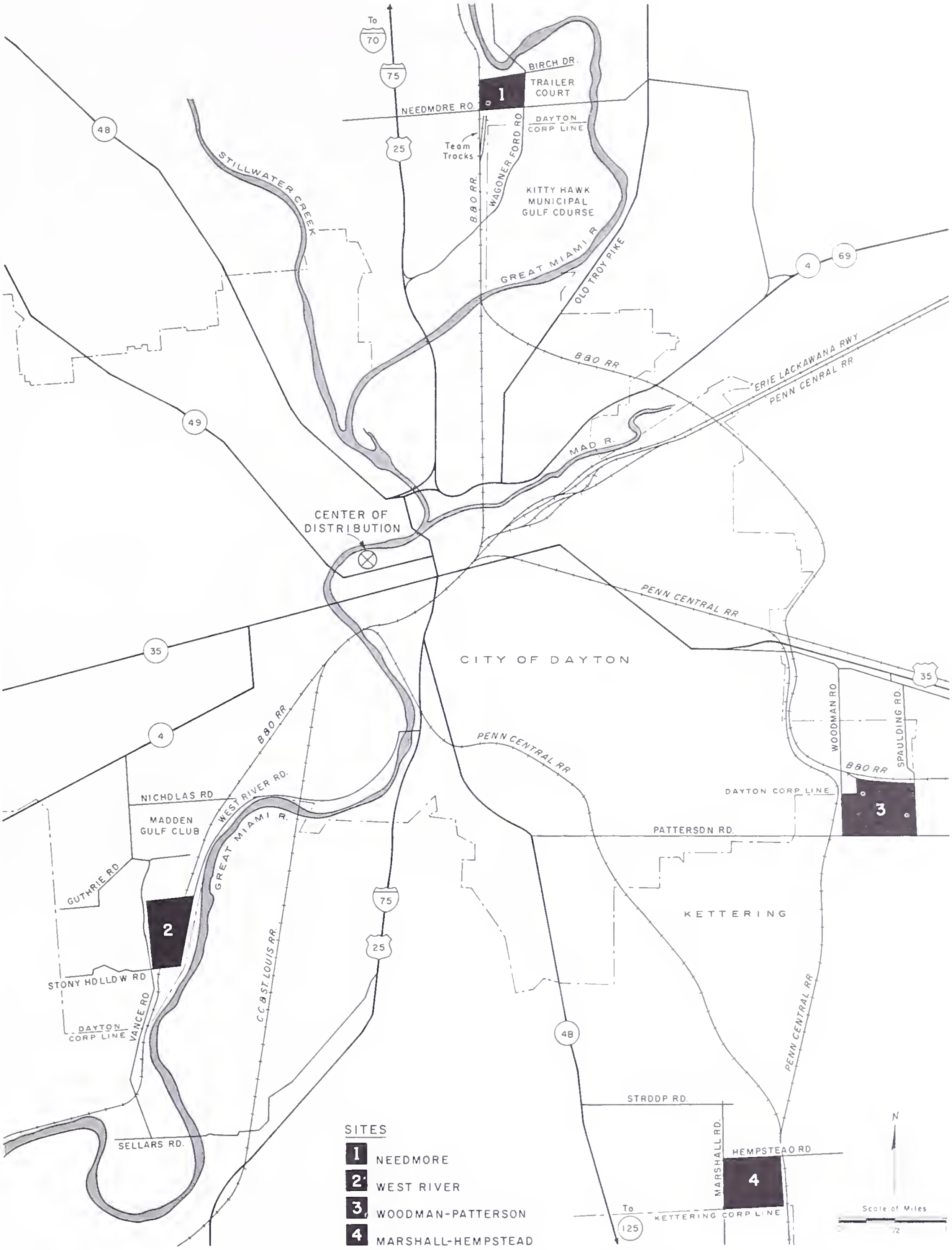

Figure 11.–Location of the four possible sites for a food distribution center, rail lines, and traffic arteries, Dayton, Ohio.

TABLE 10.–Appraisal of 4 sites for a food distribution center at Dayton

Characteristic	Needmore	West River	Woodman-Patterson Road	Marshall-Hempstead
Location and boundaries..	North of Dayton corporation line above Kitty Hawk Golf Course. Bounded on the north by Birch Drive, on east by Wagoner Ford Rd., on the south by Needmore Rd. and on the west by the B. & O. RR. Adjacent land east of Wagoner Ford Rd. available. A bend of the Great Miami River lies to the North.	Within Dayton Corporation line at southside of city. Bounded on the north by a line with a section of Guthrie Rd. below Madden Park, on the east by West River Rd. and Dayton city line, on the south by Stony Hollow Rd., and on the west by Vance Rd. The Miami River flows near the eastern side.	South of Dayton Corporation line is bounded on the north by the B. & O. RR., on the east by Spaulding Rd., on the south by Patterson Rd., and on the west by Woodman Rd.	North of the Kettering Corporation line of metropolitan Dayton. Is bounded on the north by Hempstead Rd., on the east by the Penn Central RR., on the south by the Kettering Corporation line and on the west by Marshall Rd.
Land available	80 acres.	140 acres.	200 acres. (This is a farm of a State hospital that will be sold.)	160 acres.
Estimated basic land cost.	$1,000 per acre actual (assessed valuation on land $250; on buildings $300).	$730 per acre actual (assessed valuation $400 on land only).	State property not assessed. Estimated actual value $1,300 per acre. Equivalent assessed valuation would be about $700 per acre.	$2,000 per acre actual (assessed valuation $600 on land; $470 on buildings).
Present land use	Vacant land, presently being cultivated. Gasoline station and small restaurant are only improvements.	Unimproved	Unimproved	Unimproved except for small area of athletic farm gymnasium and a stock theater on Hempstead Rd.
Access to rail transportation	Baltimore and Ohio main line north and south through Dayton, borders the site on the west side. Team tracks just south of the tract. Switching via Penn Central RR., and Erie Lackawanna Ry., which line uses other tracks for traffic from the north into the city.	Baltimore and Ohio RR. crosses the site from north to south. Switching is available to the Penn Central and Erie Lackawanna Ry.	Double tracks split at northwest corner of site with one line, the B. & O. RR., passing along the north border and the Penn Central, passing near the west border. Switching is available to the Penn Central and the Erie Lackawanna.	Penn Central RR. line borders site on the east. Switching available to the B. & O. RR., and to the Erie Lackawanna north of the city.
Access to highways	Less than mile west to Dixie Highway (Interstate Rt. 75 and U.S. Rt. 25). 1 mile east to Old Troy Pike and 2 miles to Brand Pike. East-west Interstate Rd. 70 is 4 miles north.	From site to State Rt. 4 on the west is 2 miles; to Interstate Rt. 75 on the east 2 miles via bridges at Nicholas Rd. and Sellars Rd.	U.S. Rt. 35, east-west, is 1 mile north of the site; north-south State Rt. 48 3 miles west; U.S. Rt. 25 and Interstate Rt. 75 4 miles west.	1 mile to State Rt. 48 west of the site, 2 miles to State Rt. 125 at the south, 6 miles west to Interstate Rt. 75.
Distance from center of distribution	4 miles north.	3 miles southwest.	5 miles east.	7 miles southeast.

River Road on the east and Vance Road on the west.

The Baltimore and Ohio Railroad cuts through the site dividing it. However, the area is so large that this could be an asset to the center as railcars could be hauled to buildings on either or both sides of the tracks.

The site is about 15 miles from east-west Interstate 70, north of the city, and about 20 miles away from the northeast-southwest Interstate 71, south of the city. The north-south Interstate 75, however, is less than one mile to the east. Bridges conduct traffic north from this site at Nicholas Road and south from Sellars Road.

Up to 140 acres of farmland are here, with more land available for future expansion in the immediate vicinity. The land is level and would require only enough fill for good drainage. All utilities are available.

The land is reasonably priced. After purchase, it would probably be rezoned from farm to light industrial. Although rezoning would change the assessed valuation, it would improve the capital appreciation. The cost, including putting the land in condition to build, at the time of the study was $1,014 per acre.

Woodman-Patterson Site

This tract, east of downtown Dayton, is located on the border of the Dayton corporation, just inside the corporation of Kettering, which is a part of greater Dayton. It lies between Woodman and Spaulding Roads; Patterson Road is the southern boundary.

The site is served principally by the Baltimore and Ohio Railroad with the Penn Central Railroad adjoining. One branch of the railroad passes along the northern border of the site and another, the Penn Central, runs near the western side.

Woodman Road connects this area with U.S. 35 about a mile north of the site. Patterson Road connects it with State Road 48 and Interstate 75.

More than 200 acres are available. The land is level and drained, but some fill would be desirable before starting construction. This site, along with the Needmore and West River sites, is within a 5-mile radius of the center of distribution for Dayton. The cost of the land in condition to build was $1,420 per acre in 1964.

Marshall-Hempstead Site

Marshall-Hempstead lies north of Kettering corporation line. Its northern boundary is Hempstead Road. The tract lies between the Penn Central Railroad on the east and Marshall Road on the west. It is served by the Penn Central Railroad, with switching rights to the Baltimore and Ohio, and Erie Lackawanna lines.

To the west a mile away is the Dayton-Lebanon Pike, State Route 48, and almost 5 miles away in the same direction, Interstate 75. About 15 miles north and northeast is east-west Interstate 70, and about 20 miles south, southwest Interstate 71.

This site contains about 160 acres. No fill or extensive piling should be required as the land is level. Cost per acre in condition to build was estimated at $2,350 in 1964.

Table 11 shows the acreage available for each site and the estimated cost of acquiring each.

Other Sites

Several other possible sites for the market were evaluated. There is a large amount of suitable land around Dayton, and this review of four sites is not intended to discourage the consideration of any other suitable tract when similar criteria are applied.

Estimated Investment Costs of Land and Facilities

The purchase price of sufficient land for a food distribution center and the cost of getting it in condition to build will determine the money required.

TABLE 11.–Acreage available and cost for 75 acres at 4 possible sites for proposed food distribution center, Dayton

Site	Acreage available	Cost			Average cost per acre	Total cost for 75-acre site
		Land and improvements	Acquisition, development, grading, and fill	Total		
	Acres	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*Dollars*	*1,000 dollars*
Needmore	80	80	21	101	1,263	95
West River	140	102	40	142	1,014	76
Woodman-Patterson	200	260	24	284	1,420	107
Marshall-Hempstead	160	320	56	376	2,350	176

Acquisition of a site is subject to negotiation, regardless of the assessed value or appraisal of actual valuation. Parcels of land belonging to different owners may have to be assembled. Usually, civic-minded citizens can obtain the necessary acreage at a reasonable cost, since such an industry is essential to the economy of the community. The estimates shown are only those involved in buying the land, getting it in condition to build, and constructing thereon the facilities needed. They do not include costs for additional facilities that may be built later in the expansion areas or the costs of access streets, water mains, and sewers, which are usually supplied by the city.

Land

The costs for land are based upon assessed valuation in 1964 of land and the present buildings thereon, the estimated cost of acquiring and developing the site, and an estimated cost for grading and fill (table 11).

The assessment ratio in the Dayton area is generally 55 percent of the market value, according to the report of Dayton, Ohio, Industrial Sites, by the Industrial Development Department of the Baltimore and Ohio Railroad Company and the Office of the Treasurer, Montgomery County, Ohio. The present cost of land and improvements, as shown in table 11, was estimated from the assessments for certain parcels of land on the assessor's books for Montgomery County within each of the four possible sites. This assessed valuation was adjusted to 100 percent to obtain an estimated market value.

Acquisition and development costs include legal and engineering fees, damages, demolishment, and clearing costs. Costs for grading and fill are predicated upon the estimated cubic yards of dirt required to raise lowlands and reduce the level of highland to a common level. Included in these costs is the cost for labor and use of leveling and grading equipment.

Facilities

The estimated costs of new market buildings and other facilities are based on known costs of similar facilities in other locations, adjusted for differences in the indices of construction costs between them and the Dayton area.

Building costs listed in this report include those for the building shell and such bare necessities as plumbing, electric wiring, and floor drains. It is assumed that any food firm requiring refrigerated rooms would build them, and install equipment to suit the firm's individual needs.

Other facilities are trackage, sewers, floodlights, public address system, and paving. Paving costs are based on estimates provided by the Federal Bureau of Public Roads for 1965 on the cost of 2-inch asphaltic concrete on a 4-inch macadam base and 7-inch gravel foundation.

The estimates of the cost of facilities are based on masonry and steel construction.

Architect's and engineer's fees at 6 percent of construction costs and a construction loan at 6 percent of the cumulative construction costs are included. A 10-percent contingency is added to the total of the construction costs, fees, and loan.

The following estimates should be used only as a guide in arriving at a total estimated cost for the project; these costs are NOT intended to replace firm estimates made by local architects and contractors at the time the construction starts. These cost estimates are calculated for the Needmore site. Construction costs on the other three sites would be similar.

Investment costs for all of the proposed facilities would amount to about $4,802,400. The cost for 75 acres on the Needmore site was estimated at $94,700. The total estimated cost of land and facilities was $4,897,100.

The cost for the land and the multiple-occupancy buildings planned for the 34 independent food firms and one restaurant proprietor would amount to about $3,569,300.

A summary of the estimated costs for land and facilities on the Needmore site is shown in table 12.

Fruit and Vegetable Section

Multiple-occupancy facilities:	
Building:	
1 building with 18 units, including mezzanines and utility tunnel under the rear platform (one unit used as a restaurant), 2,500 sq. ft. 1st floor space and 350 sq. ft. of space under the rear platform, $22,800 per unit	$410,400
Restrooms under restaurant, 24x30 ft., 720 sq. ft.	9,100
Total construction cost of building	419,500
Other facilities:	
Trackage:[1]	
House and lead-in tracks 1,600 ft. @ $15 per ft.	24,000
Switches, single, 2 @ $2,500 each	5,000
Paving (bituminous concrete): 18,000 sq. yd. @ $3.50 per sq. yd.	63,000
Sewers:	
15-in. storm, 1,000 ft. @ $6.00 per ft.	6,000
12-in. sanitary 350 ft. @ $6.40 per ft.	2,200
Floodlights: 10 @ $150 each	1,500
Public address system	300
Total construction cost of other facilities	102,000
Total construction costs of buildings and other facilities	521,500
Associated construction costs:[2]	
Architect's and engineer's fees	31,300
Construction loan	33,200
Contingency	58,600
Total building, other facilities, and associated costs	644,600
Land; 5.5 acres @ $1,263 per acre	7,000
Total investment costs of fruit and vegetable section	651,600

Farmers' Market

Building:	
1 shed with 20 stalls – 2,400 sq. ft. (2 stalls enclosed for a manager's office and a public restroom)	5,000
Total construction cost of the building	5,000
Other facilities:	
Paving (bituminous concrete) 11,000 sq. yd. @ $3.50 per sq. yd.	38,500
Sewers:	
15-in. storm, 700 ft. @ $6.00 per ft.	4,200
12-in. sanitary, 400 ft. @ $6.40 per ft.	2,600
Floodlights: 4 @ $150 each	600
Total construction cost of other facilities	45,900
Total construction costs of building and other facilities	50,900
Associated construction costs:[2]	
Architect's and engineer's fees	3,100
Construction loan	3,200
Contingency	5,700
Total costs of building, facilities, and other associated costs	62,900
Land, 2.4 acres @ $1,263 per acre	3,000
Total investment costs for farmers' market	65,900

See footnotes at end of tabulation.

Meat and Related Products Section

Multiple-occupancy facilities:	
Building:	
1 building with 10 units including a 2d floor and utility tunnel under the front platform--2,500 sq. ft. of 1st floor space, 1,800 sq. ft. 2d floor space and 350 sq. ft. of space under front platform – $25,700 per unit	$257,000
Meat rails installed on platforms @ $450 per unit	4,500
Grease traps @ $300 per unit	3,000
Total construction cost of building	264,500
Other facilities:[3]	
Trackage:	
House and lead-in tracks 1,000 ft. @ $15 per ft.	15,000
Switches, 2 @ $2,500 each	5,000
Paving (bituminous concrete) 12,000 sq. yd. @ $350 per sq. yd.	42,000
Sewers:	
15-in. storm, 600 ft. @ $6.00 per ft.	3,600
12-in. sanitary, 250 ft. @ $6.40 per ft.	1,600
Floodlights: 6 @ $150 each	900
Total construction cost of other facilities	68,100
Total construction costs of building and other facilities	332,600
Associated construction costs:[2]	
Architect's and engineer's fees	20,000
Construction loan	21,200
Contingency	37,400
Total investment costs of building, other facilities, and associated costs	411,200
Land, 3.3 acres @ $1,263 per acre	4,200
Total investment costs of meat and related products section	415,400

Dairy Products and Eggs Section

Multiple-occupancy facility:	
Building:	
6 units in building shared with meat operators, including mezzanines and utility tunnel–2,500 sq. ft. 1st floor space and 350 sq. ft. under the rear platform @ $22,800 per unit	136,800
Other facilities:	
Paving (bituminous concrete) 7,600 sq. yd. @ $3.50 per sq. yd.	26,600
Sewers:	
15-in. storm, 200 ft. @ $6.00 per ft.	1,200
12-in. sanitary, 100 ft. @ $6.40 per ft.	600
Floodlights: 4 @ $150 each	600
Total construction cost of other facilities	29,000
Total construction costs of building and facilities	165,800
Associated construction costs:[2]	
Architect's and engineer's fees	9,900
Construction loan	10,500
Contingency	18,600
Total investment cost of building, facilities, and associated costs	204,800
Land, 2 acres @ $1,263 per acre	2,500
Total investment costs of dairy products and eggs section	207,300

See footnotes at end of tabulation.

Grocery Section

Multiple-occupancy facilities:	
Building:	
1 building with 7 units including mezzanines–2,500 sq. ft. of 1st floor space–$22,800 per unit	$159,600
Other facilities:	
Trackage:	
House and lead-in tracks, 1,100 ft. @ $15 per ft.	16,500
Switches 1 @ $2,500 each	2,500
Paving (bituminous concrete): 8,600 sq. yd. @ $3.50 per sq. yd.	30,100
Sewers:	
15-in. storm, 400 ft. @ $6.00 per ft.	2,400
12-in. sanitary, 225 ft. @ $6.40 per ft.	1,400
Floodlights, 4 @ $150 each	600
Total construction cost of other facilities	53,500
Total construction costs of building and other facilities	213,100
Associated construction costs:[2]	
Architect's and engineer's fees	12,800
Construction loan	13,600
Contingency	24,000
Total investment cost of building, facilities, and associated costs	263,500
Land, 3.8 acres @ $1,263 per acre	4,800
Total investment costs for multiple-occupancy grocery facilities	268,300
Single-occupancy facilities:	
1 building containing 96,000 sq. ft. 1st floor space and 12,000 sq. ft. of 2d floor space	864,000
Other facilities:	
Trackage:	
House and lead-in tracks, 1,050 ft. @ $15 per ft.	15,800
Switches, 1 @ $2,500	2,500
Paving (bituminous concrete) 24,300 sq. yd. @ $3.50 per sq. yd.	85,000
Sewers:	
15-in. storm, 230 ft. @ $6.00 per ft.	1,400
12-in. sanitary, 160 ft. @ $6.40 per ft.	1,000
Floodlights, 6 @ $150 each	900
Total construction cost of other facilities	106,600
Total construction costs of building and other facilities	970,600
Associated construction costs:[2]	
Architect's and engineer's fees	58,200
Construction loan	61,700
Contingency	109,100
Total investment cost of building, facilities, and associated costs	$1,199,600
Land, 7.4 acres @ $1,263 per acre	9,300
Total investment cost for single-occupancy grocery facilities	1,208,900

Frozen Foods Section

Multiple-occupancy facilities:	
Building:	
1 building with 15 units including mezzanine and utility tunnel under the rear platform, 99,100 cu. ft. per unit, or a total of 1,486,500 cu. ft. @ $0.996 per cu. ft.	[4] 1,482,000

See footnotes at end of tabulation.

Frozen Foods Section—Continued

Other facilities:	
Trackage:	
House and lead-in tracks, 1,800 ft. @ $15 per ft.	$27,000
Switches, 2 @ $2,500 each	5,000
Paving (bituminous concrete): 31,000 sq. yd. @ $3.50 per sq. yd.	108,500
Sewers:	
15-in. storm, 750 ft. @ $6.00 per ft.	4,500
12-in. sanitary, 375 ft. @ $6.40 per ft.	2,400
Floodlights, 10 @ $150 each	1,500
Total construction cost of other facilities	148,900
Total construction costs of building and other facilities	$1,630,900
Associated construction costs:[2]	
Architect's and engineer's fees	97,900
Construction loan	103,700
Contingency	183,300
Total investment costs of building, other facilities, and associated costs	2,015,800
Land, 8.6 acres @ $1,263 per acre	10,900
Total investment cost for frozen food section	2,026,700

[1] Trackage and costs of other railroad equipment are based on estimates of the Baltimore and Ohio Railroad.

[2] Associated construction costs are estimated as follows: Architect's and engineer's fees = 6 percent of building and facilities costs; construction loan = 6 percent of buildings and facilities costs and architect's and engineer's fees; contingency = 10 percent of building and facilities costs, architect's and engineers' fees, and construction loan.

[3] Insulation and refrigeration would be installed at operator's expense since the needs of individual dealers of meat and related products are unknown.

[4] Includes cost of insulation and refrigeration equipment.

TABLE 12.—Summary of estimated investment costs of land and facilities, by commodity group and type of facility, on the Needmore site

Type of facility or commodity group	Acreage needed	Estimated costs: Land[1]	Estimated costs: Facilities	Estimated costs: Total
	Acres	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Multiple-occupancy buildings:				
Fruits and vegetables	5.5	7.0	644.6	651.6
Meats and related products	3.3	4.2	411.2	415.4
Dairy products and eggs	2.0	2.5	204.8	207.3
Groceries	3.8	4.8	263.5	268.3
Frozen foods	8.6	10.9	2,015.8	2,026.7
Total	23.2	29.4	3,539.9	3,569.3
Farmers' market	2.4	3.0	62.9	65.9
Single-occupancy building, independent grocery wholesaler	7.4	9.3	1,199.6	1,208.9
Total for planned facilities	33.0	41.7	4,802.4	4,844.1
Allied industry area	42.0	53.0	(2)	53.0
Grand total	75.0	94.7	4,802.4	4,897.1

[1] Cost of land in condition to build is based on $1,263 per acre.

[2] Exact kind and amount of facilities that will be built not known.

OWNERSHIP AND MANAGEMENT OF A FOOD DISTRIBUTION CENTER

A food distribution center can be financed and operated in several ways.[3] Some of these centers have been financed and operated as private corporations. Others have been organized as public benefit corporations, direct public ownership, or a combination of these.

Private Corporations

One advantage of corporate ownership is that the owners have complete control over operations, subject only to general legal restrictions. Also, when the period of amortization expires, the entire investment belongs to the stockholders. Tenancy changes have no effect upon stock ownership, and transfer of stock is unrestricted. The major problem of private corporate ownership of a food center is that substantial equity capital is usually needed to secure financing of the project.

Many private corporations are cooperatives, where the individual food firms are the stockholders. The stockholders contribute the required revenue for debt service, maintenance, utilities, and management. Private corporations may be either profit-making or nonprofit organizations.

When a private corporation is operated on a nonprofit basis, the sale of shares of voting stock is usually restricted. A nonprofit market corporation probably would restrict the sale of this stock to farmers, truckers, food firms and others directly concerned with the operation of the market, and would base the amount of stock sold to one individual or firm on the amount of space occupied. Some private corporations also require eligible purchasers of voting stock also to purchase a specified number of shares of nonvoting stock. Through these restrictions on sales of stock, the number of stockholders' votes and the voice of any one shareholder in management are limited.

Many food markets are owned and operated by private corporations. Usually, the principal stockholders in these corporations are the tenants of the market, the food dealers. In others, the corporation is a railroad or some other company organized primarily for a different type of business. Most of the large terminal produce markets built in the 1920's were sponsored by railroad companies that believed such markets would increase the volume of food hauled by their lines.

Public Benefit Corporations

A public benefit corporation is a nonprofit organization differing from private nonprofit corporations in that it is controlled by a State, county, or municipality for the benefit of the local citizens. Market authorities are frequently organized as public benefit corporations and offer some desirable features not found in some other types of ownership. Since a public agency is nonprofit, rentals and other charges do not exceed the amount needed to pay the costs of operation, to amortize the original investment, and to maintain limited reserves for contingencies. The reserve funds cannot be paid to tenants as dividends because, under public ownership, revenues are considered public funds. However, there is the possibility that reserves might be appropriated for other public uses while bonds remained outstanding, unless such reserves were specifically committed to redemption of bonds.

Market authorities usually have the power of eminent domain, which can be useful in the acquisition of a site. Such corporations usually finance market improvements through the sale of revenue bonds. This type of financing normally does not entail a full obligation of a State or a political subdivision. Since these revenue bonds are often tax exempt, the interest cost is lower than for other ways of financing. However, even if the bonds are not tax exempt, they usually have such established credit ratings that they can be sold at favorable rates.

A public agency, such as a market authority, is more likely to provide for future expansion and work toward the establishment of a complete food distribution center than are some types of private ownership. A market authority may or may not be required to pay taxes to the community in which it is located. In some States, legislation permits a municipal market authority to own and administer a food distribution center located outside its city limits. Such taxes, or payment in lieu thereof, may be shared by the city and the outlying township or other political subdivision.

Market authorities also have certain limitations, especially in the financing and managing of the facilities. For example, they cannot raise funds for capital improvements except through the sale of revenue bonds. To overcome this serious limitation, some State or city governments have appropriated part of the funds needed for land acquisition and original construction. As a rule, a market authority must have either equity funds or public responsibility for its loans. The continuity of management in some markets has depended upon the continuance of a State or municipal government administration in office. On the whole, market authorities do not have as complete freedom of operation as is possible under private ownership.

Direct Public Ownership

Some food market facilities have been financed, constructed, and managed by States, counties, or municipalities. Several such governmental jurisdictions have enabling legislation covering the improvement or establishment of produce markets.

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[3] For more information on types of ownership and methods of financing, see: Clowes, H. G., Elliott, W. H., and Crow, W. C. *Wholesale Food Market Facilities–Types of Ownership and Methods of Financing.* U.S. Dept. Agr., Market. Res. Rpt. 160, 96 pp., illus. 1957.

Direct State ownership and management of a food market facility usually can be differentiated from that of a State market authority by the methods of financing used and the delegation of authority made by the State legislature. Although a number of States have appropriated funds to establish market authorities and have otherwise assisted them, they do not usually underwrite the total cost of these markets nor directly assume responsibility for their operation. With direct State ownership, a market facility is financed in whole or in greater part by an appropriation of State funds. If the market is not financed entirely by State appropriations, the State usually is obligated for the remainder, unless this balance is obtained through grants or donations. Also, the State is responsible for maintenance and other expense involved in the operation of such a market.

Municipal or county ownership of a produce market is comparable in many respects to direct State ownership. Some municipalities are authorized by their charters to construct and operate food markets. However, most city councils or commissions do not have authority to appropriate general funds for construction of market facilities on a basis comparable to that of a State legislature. Three methods are usually open to municipalities for financing a market program: (1) Issuing municipal bonds; (2) issuing revenue warrants; and (3) obtaining loans from public corporations. In many cities, the issuance of bonds for such purposes must be approved in a referendum by a majority of the qualified voters. Facilities constructed with municipal or county funds would necessarily be owned by the city or county government.

Combinations

Food markets have been established by combining two or more of the types of ownership and operation. For example, a food center in Philadelphia was built by a nonprofit organization on land owned and put in condition for construction by the city. This corporation built and leased some buildings, but most of the individual occupancy buildings were privately owned.

In Dayton, a food center may be financed conveniently by using two or more of these methods. For a market of the size of a Dayton food center, a single agency should be sufficient to administer the construction and operation. The farmers may wish to select a manager for their market.

Estimated Annual Costs and Revenue Requirements

The annual costs of operating the food distribution center include (1) debt service on the investment in land and facilities, (2) real estate taxes, and (3) management and maintenance costs. Total annual revenue required is then determined by these three items.

Generally the single-occupancy grocery building and any service facilities constructed would be designed and financed according to the specific demands of the owners. The predominantly wholesale farmers' market would be financed, as it frequently is, by group investment and from daily trading fees collected by a cooperative association. The land needed for such facilities, including a farmers' market building, could be purchased, or leased, from the private corporation or other legal entity developing the market.

In this report, the market charges and total revenue requirements are computed only for the multiple-occupancy area of the market under the assumption that it will be financed as a private corporation without subsidy.

Debt Service Payments

The first major segment of cost that must be paid by a private corporation financing and operating a food distribution center is debt service. If the market is to be self-liquidating, the investment must be repaid from revenue derived from the market operation. Certain standards for payment must be adhered to. The facilities proposed for the center should not become obsolete in less than 30 years, and probably would be useful for a much longer period. The facilities proposed are of durable construction and, with only minor alterations, could be expanded or converted to use by different businesses.

A private corporation financing, constructing, and operating the distribution center would probably use first and second mortgage bonds and either equity capital or an interest-bearing instrument. Generally, 65 percent of the financing may be obtained on a first mortgage, although, depending on the time of financing, the supply may range from 60 to 70 percent. About 25 percent may be obtained by a second mortgage, but that, too, may vary by 5 percent either way. The remaining 10 percent could be equity capital which would be of higher risk where the food firms as owners could not expect a yield, but may benefit by capital appreciation since improved real estate generally increases in value. However, to set a value on the entire investment, the last 10 percent is designated here a third mortgage held by the food firms themselves.

Requirements for these loans are assumed at 6 percent for a first mortgage, 6.5 percent for a second mortgage, and 7 percent for the balance. Using these estimates, a rate slightly less than 6.5 percent would result throughout the 30 years of amortization of all three mortgages. The average interest rate, weighted for amount of funds supplied under first and second mortgages with 10 percent equity capital deposited in advance, would be a little over 6 percent.

When the mortgage bonds, or any other debt or equity instruments other than municipal or other government bonds having the full faith of the local government, are issued, reserve funds must be established over the amount needed to operate and maintain the market. Collections are proposed for this at the rate of 10 percent a year until the amount in the sinking fund would cover the amortization payment of one full year. The computations include a 10-percent contingency for this item.

Because the exact terms of obtaining finances would not be known until a financial plan has been negotiated, an interest rate of 6.5 percent for a 30-year period has been used to determine the amount of annual rents necessary. Based on this, the rate of amortization would be $76.58 per $1,000 per year.

Table 13 shows the estimated annual income required for debt service to amortize the costs of a proposed food distribution center at the Needmore site. If anyone of the three other sites described is selected, the result would be affected only slightly.

Real Estate Taxes

A food distribution center organization would be expected to pay taxes on land and buildings at the current rate for city and county taxes on the assessed valuation of the property. In 1964, assessed valuation in Montgomery County was 55 percent of the market value. In Dayton the tax rate as of November 3, 1964, was $39.80 per $1,000 assessed valuation. This rate applies to both the Needmore and the West River sites. The Woodman-Patterson Road and Marshall-Hempstead sites are in the incorporated city of Kettering of the Dayton metropolitan area, Montgomery County, and have tax rates of $41.20 per $1,000 assessed valuation.

A 10-percent contingency is provided to allow for possible increases in the tax rate or reassessments. Estimated annual real estate taxes for each commodity group that would occupy the multiple-occupancy buildings included under overall market management are shown in table 13.

TABLE 13.–Estimated annual revenue required for payments of debt service, real estate taxes, and reserve funds for the multiple-occupancy buildings on the Needmore site, Dayton[1]

Commodity group	Investment cost of land and facilities	Debt service			Taxes		
		Amortization charge[2]	Reserve[3]	Total	Amount[4]	Reserve[3]	Total
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Fruits and vegetables	651.6	49.9	5.0	54.9	14.3	1.4	15.7
Meat and related products . . .	415.4	31.8	3.2	35.0	9.1	.9	10.0
Dairy products and eggs	207.3	15.9	1.6	17.5	4.5	.5	5.0
Groceries	268.3	20.5	2.1	22.6	5.9	.6	6.5
Frozen foods.	2,026.7	155.2	15.5	170.7	44.3	4.4	48.7
Total	3,569.3	273.3	27.4	300.7	78.1	7.8	85.9

[1] Required revenue for all 4 sites is nearly the same.

[2] Based on 6.5 percent per year of the investment in land and facilities over a 30-year period at a cost of $76.58 per $1,000 per year.

[3] 10 percent of amortization charge and of the taxes until the equivalent of 1 year's total payment is accumulated.

[4] Computed on an assessed valuation of 55 percent of cost of land and facilities at tax rate of $39.80 per $1,000.

Management Costs

The major operating expenses are salaries for the manager and other employees, fees for special services, rent for an office, advertising, travel, office supplies, maintenance, fire and personal property insurance premiums, and refuse and snow removal. In some markets in major cities, separate companies provide for these services. But to conserve funds in Dayton, any associations of common interest established are expected to perform certain administrative duties without charge to the food center corporation. Annual operating costs of the food center are estimated as follows:

Management:	
Salaries:	
Manager	$ 12,000
Secretary (accounting and typing)	5,500
Total	17,500
Salary and wage benefits, 12 percent	2,100
Total salaries	19,600
Associated expenses:	
Office rent[1]	2,500
Travel and business expense	1,200
Utilities (electric, gas, water, communications)	3,500
Office equipment and supplies	2,000
Legal, auditing, and other services	3,000
Insurance (fire and comprehensive, liability, automobile)	250
Miscellaneous	600
Total associated expenses	13,050
Maintenance:	
Sanitation, refuse, and snow removal	6,000
Maintenance and repairs[2]	26,550
Fire and comprehensive insurance[3]	3,060
Liability insurance[4]	440
Miscellaneous	1,800
Total maintenance	37,850
Total costs	70,500
Contingency[5]	7,050
Grand total	77,550

[1] Office location suggested for farmers' market shed or otherwise in available mezzanine space.
[2] 3/4 of 1 percent of investment in multiple-occupancy facilities.
[3] 80 percent of construction costs of buildings @ $1.15/$1,000.
[4] $1.75/$1,000 for $250,000.
[5] 10 percent of total expenses.

Total Revenue Required and Estimated Rentals

The estimated annual revenue required to meet debt service charges, taxes, and management costs for the multiple-occupancy buildings included in the plan is $464,200 (table 14). Excluded is the annual revenue required for land and facilities for the single-occupancy grocery warehouse, the farmers' market, and the land to be set aside for allied industries.

The revenue needed to support any food market must be obtained from rents and charges for facilities. Some dealers claim that it takes both a buyer and a seller to make a market and that each should contribute his share to defray the expenses. But to be practical under present circumstances, buyers cannot well be penalized for coming to the market by being charged such fees as for parking or loading. Should conditions reach the point of buyers' acceptance, some share of the cost for the operation of the market may be charged to them. At present, however, if the rent is not all-inclusive, tenants may be charged separately for maintenance and services, including management.

In any event, the construction program of the food center, following a master plan, would be essentially nonprofit, with only a small surplus collected for a possible vacancy or emergency. Any substantial excess of funds would ordinarily be credited to the group of tenant stockholders or other sponsoring organization as either capital appreciation or incidental investment yield to use as it sees fitting. The management of the market (the board of directors and its executive officer—possibly the market manager) must decide the best way of apportioning the required revenue among the operators of the food distribution center and the facilities involved.

In the following discussion, it is assumed that the annual income required will be obtained from rentals of

TABLE 14.–Estimated annual revenue required by commodity group for debt service, taxes, and management and maintenance of the multiple-occupancy buildings in the proposed food center on the Needmore site

Commodity group	Debt service	Taxes	Management and maintenance[1]	Total
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Fruits and vegetables[2]	54.9	15.7	14.1	84.7
Meat and related products . . .	35.0	10.0	9.0	54.0
Dairy products and eggs	17.5	5.0	4.5	27.0
Groceries	22.6	6.5	5.8	34.9
Frozen foods	170.7	48.7	44.2	263.6
Total	300.7	85.9	77.6	464.2

[1] Prorated on the basis of relative value of facilities.

[2] Includes 1 restaurant unit with restrooms underneath.

the facilities. Obviously, such rentals would be reduced if some of the required revenue were derived from other sources. Table 15 shows the suggested rental schedules based on annual revenue required (table 14) for a market built on the Needmore site. The estimated annual revenue required would be practically the same for any site evaluated, since differences in cost of land are inconsequential in relation to the total cost of land and facilities together.

Some meat and related products firms will probably have sufficient surplus space on the second floor to offer as office space to food brokers who require offices in the center. Or this space might be offered to the manager of the center as an alternate location for an office. If the fruit and vegetable firms should be the first to move into the center, they may have more space than they need on the mezzanine that can be rented out for offices.

TABLE 15.–Estimated rentals needed, by commodity group or type of facility, to produce the total annual revenue required for the multiple-occupancy building area in a food distribution center on the Needmore site

Commodity group or type of facility	Floor space	Estimated annual rent	
		Per square foot	Total
	Square feet	*Dollars*	*1,000 dollars*
Fruits and vegetables .	48,450	1.70	82.4
Meat and related products	43,000	1.30	55.9
Dairy products and eggs	17,100	1.60	27.4
Groceries	20,475	1.70	34.8
Frozen foods	67,500	3.84	259.3
Restaurant[1]	3,570	2.90	10.4
Total or average	200,095	2.35	470.2

[1] Located in the fruits and vegetables building.

Rentals per square foot should be nearly the same for identical buildings and other facilities constructed at the same time. The suggested schedule of rents would yield slightly more than the annual revenue required if facilities are completely occupied. Although no facility should be built which does not have a definite lease from a responsible firm, it is prudent that the rental scale should yield some margin above the minimum requirements. The schedule of rents shown in table 15 provides such a margin, plus the allowance for contingencies that were considered in calculating the total annual revenue required. To more than cover the required revenue of $464,100, the intended collections of rent would be an estimated $470,200.

Estimated Cost Reductions

Estimates of the major cost items for independent dealers moving food through the multiple-occupancy facilities in a new food center are presented in this section.

The estimated handling and other costs for the proposed facilities are a composite of costs obtained from new markets built in other cities where conditions are comparable to those of Dayton. These data are used to indicate the savings between the average costs of operation in the existing facilities of the 34 independent wholesale food handlers and in the proposed new facilities.

The marketing costs that would be affected most by improved facilities are (1) cartage, (2) handling, (3) interdealer transfers, (4) spoilage, deterioration, breakage, and shrinkage, and (5) rentals or occupancy charges. Although these are not the only marketing costs, they represent the major sources of savings or cost changes that would be affected by operating in new facilities.

Costs were found for the year of the study, but are tentatively listed as annual costs.

Cartage

Cartage is the cost incurred in going to the points of initial receipt, loading, and moving products from these points, such as team tracks, railroad freight terminals, and warehouses, to the dealers' stores. In the new facilities, the costs for cartage will be reduced because most railcars would arrive directly at the dealers' stores. Some dealers, however, would probably have to pay occasionally for the cartage of products received in pooled cars or from some processing plants. Total annual savings in cartage of all produce is estimated at $30,628. Possible savings in cartage, by commodity, are shown in table 16.

Handling

Handling costs that can be reduced are the costs of moving commodities through a facility from the unloading of incoming vehicles to the loading of outbound trucks. The total handling costs of $1,122,060, as estimated for the proposed facilities, would be 67 percent of the present costs, or a reduction of $561,518 (table 17).

Interdealer Transfers

The most notable saving in interdealer transfers would accrue to the fruit and vegetable dealers, but all commodity groups could expect some savings. The total of such costs is estimated at $59,602 for the proposed food center, or 58 percent of the $103,503 occurring in the existing facilities of 34 dealers who would move to multiple-occupancy buildings (table 18). The total estimated cost reduction is $43,901.

TABLE 16.–Estimated annual savings in the cost of cartage of food products for 34 independent food operators, Dayton

Commodity group	Tonnage incurring cost		Cost per ton present or proposed	Total cost		Savings
	Present	Proposed		Present	Proposed	
	Tons	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fruits and vegetables	3,970	390	3.96	15,721	1,544	14,177
Meat and related products	1,750	260	3.79	6,633	985	5,648
Dairy products and eggs	255	210	3.22	821	676	145
Groceries	2,600	390	3.65	9,490	1,424	8,066
Frozen foods.	940	90	3.05	2,867	275	2,592
Total	9,515	1,340	–	35,532	4,904	30,628

TABLE 17.–Estimated annual savings in the cost of handling food products for 34 food operators, Dayton

Commodity group	Tonnage incurring cost[1]	Cost per ton		Total cost		Savings
		Present	Proposed	Present	Proposed	
	Tons	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fruits and vegetables	56,760	6.37	2.01	361,561	114,088	247,473
Meat and related products . . .	37,055	16.43	13.37	608,814	495,425	113,389
Dairy products and eggs . . .	13,955	6.71	4.50	93,638	62,798	30,840
Groceries	55,465	7.40	5.25	410,441	291,191	119,250
Frozen foods.	25,410	8.23	6.24	209,124	158,558	50,566
Total or average	188,645	8.92	5.95	1,638,578	1,122,060	561,518

[1] Includes direct receipts plus transfers.

Spoilage, Deterioration, Breakage, and Shrinkage

Spoilage, deterioration, breakage, and shrinkage should be substantially reduced in a new food center. Estimated costs in the proposed food center would be 59 percent of present costs, or a saving of $219,798 (table 19).

Rents

The comparison of rents in table 20 indicates that only fruits and vegetables and meat and related products would have savings, while all the others would have increases. Net charge for rent would be increased 7 percent, or $30,130, for vastly improved facilities.

Summary of Measurable Costs

The total costs estimated for the 34 independent dealers who are likely to move into multiple-occupancy buildings of the proposed food distribution center would amount to $1,958,919 (table 21). These same costs in the old facilities amounted to $2,784,634. The total reduction or saving is estimated to be $825,715. The cost reductions are not uniform for all the commodity sections. The fresh fruit and vegetable group could reduce costs $390,035, the meat and related products, $220,893, the dairy products and eggs, $54,022, the grocery, $151,633, and the frozen foods, $9,132.

No comparison is made of costs for farmers' market facilities.

Nonmeasurable Benefits

In addition to measurable benefits, there are numerous benefits which are not readily measurable in dollars. These benefits are intangible and would accrue not only to food dealers, but also to others interested in the food center.

Food dealers who move to the center could benefit through savings in time of salesmen, through an increased volume of business by improved capacity, service, and expended transportation, and, in general, through better working conditions. Streamline operations and modern facilities in a new food center could improve the prestige of the food commodity businesses. Sacrifice sales, resulting from excess or off-condition

TABLE 18.–Estimated annual savings in transferring food products by 34 food operators, Dayton

Commodity group	Tonnage incurring cost	Cost per ton		Total cost		Savings
		Present	Proposed	Present	Proposed	
	Tons	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fruits and vegetables	14,306	3.27	1.75	46,781	25,036	21,745
Meat and related products . . .	9,201	3.19	1.80	29,351	16,562	12,789
Dairy products and eggs	3,264	2.52	1.60	8,225	5,222	3,003
Groceries	1,878	2.98	1.95	5,596	3,662	1,934
Frozen foods	4,343	3.12	2.10	13,550	9,120	4,430
Total or average	32,992	3.14	1.81	103,503	59,602	43,901

TABLE 19.–Estimated annual savings in spoilage, deterioration, breakage, and shrinkage costs in handling food products for 34 food operators, Dayton

Commodity group	Tonnage incurring cost[1]	Cost per ton		Total cost		Cost reduction
		Present	Proposed	Present	Proposed	
	Tons	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fruits and vegetables	56,760	2.85	1.10	161,766	62,436	99,330
Meat and related products . . .	37,055	4.90	4.10	181,570	151,923	29,647
Dairy products and eggs	13,955	2.63	1.15	36,702	16,048	20,654
Groceries	55,465	1.50	1.00	83,198	55,465	27,733
Frozen foods	25,410	2.72	1.05	69,115	26,681	42,434
Total or average	188,645	2.82	1.66	532,351	312,553	219,798

[1] Includes total receipts plus transfers.

TABLE 20.–Estimated annual rentals in the present and proposed facilities for 34 independent food operators, Dayton

Commodity group	Space used		Rent		Rental savings[2]
	Present	Proposed	Present[1]	Proposed	
	Square feet	*Square feet*	*Dollars*	*Dollars*	*Dollars*
Fruits and vegetables	70,912	48,450	89,710	[3] 82,400	7,310
Meat and related products	116,650	43,000	123,920	64,500	59,420
Dairy products and eggs	19,700	17,100	27,580	28,200	(620)
Groceries	20,081	20,475	29,550	34,900	(5,350)
Frozen foods	62,256	67,500	158,910	249,800	(90,890)
Total	289,599	196,525	429,670	459,800	(30,130)

[1] Includes public storage and demurrage charges.
[2] Numbers in parenthesis are net increases.
[3] Does not include the restaurant.

TABLE 21.–Summary of estimated annual costs and possible annual savings in a proposed food center on the Needmore site, Dayton

Commodity group	Costs		Ratio of proposed to present costs	Savings
	Present	Proposed		
	Dollars	*Dollars*	*Percent*	*Dollars*
Fruits and vegetables	675,539	285,504	42	390,035
Meat and related products	950,288	729,395	77	220,893
Dairy products and eggs	166,966	112,944	68	54,022
Groceries	538,275	386,642	72	151,633
Frozen foods	453,566	444,434	98	9,132
Total or average	2,784,634	1,958,919	70	825,715

supplies, could be reduced by better communications and facilities to hold perishable merchandise. House tracks are assets for handling greater volumes at less cost. Crews will be able to unload railcars directly at facilities–a saving in time and convenience. With larger inventories and more efficient working conditions, firms should be better equipped to serve customers, thereby increasing their sales. Better working conditions and ordinary conveniences, such as parking places, may bolster employees' morale, resulting in smaller turnover.

Furthermore, a new market provides an essential group of modern facilities whereby the business of tenants may succeed, and with sufficient space for expansion, permit it to grow.

Buyers using the proposed food center could also expect to profit in various ways. With the housing of the different food dealers in one area, they would be better informed regarding prices and supplies and could shop in less time.

Truckers and others hauling merchandise could load and unload directly at the facilities, saving valuable time. With wide streets and adequate parking facilities in the area, traffic congestion and parking would be eliminated.

Lack of direct rail spurs at present markets puts the railroads at some competitive disadvantages in handling many commodities. Shippers often decide to ship by truck because costs are lower than by rail when the cost of cartage from terminal to warehouse are added. In the new center, rail sidings would permit direct unloading at dealers' stores, eliminating extra cartage costs.

Farmers could expect savings and benefits that are not immediately evident. The new facilities would give them a convenient central location for sales of farm products and permit selling during inclement weather. Because of the proximity of the farmers' market to the food dealers, farmers would not need to rely as much upon consumer purchases of their products; they could, therefore, spend less time on the market by transferring greater quantities to dealers.

If the present highway and redevelopment plans for Dayton materialize, food dealers other than those provided for in the plans will be forced to relocate or go out of business. A food center would provide a desirable area and business climate for such relocations. Not only would a modern food center minimize the cost of new facilities for specific dealers, but it would also enable them to maintain or improve their competitive position among food dealers in nearby cities.

Consumers in the area could expect better quality merchandise from a new food distribution center, because food would be properly handled and refrigerated in new facilities.

CONCLUSIONS

Constructing a modern food distribution center in Dayton is economically feasible. As a regional market for the city and southwest Ohio, the center would replace present inefficient and outmoded facilities, benefiting not only the trade groups and individuals directly involved, but also the community at large.

Such a regional market would be feasible if:

(1) It is built at a convenient location with unrestricted receiving and distribution.

(2) A master plan is prepared and adopted at the outset so that the first buildings constructed will not interfere with later full development of the center.

(3) The facilities to be included, the amount of land needed, and the requisites for the site are in accordance with the findings of this study, and caution is exercised in scheduling construction of buildings and the occupancy of proprietors who would move in now or later.

(4) Plans are coordinated with the planning of the City Plan Board, including those for redevelopment of blighted areas, future location of major expressways and other transportations arteries, and with facilities now planned or under construction.

(5) An effective sponsoring group is established to develop and implement a sound organizational and construction program.

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